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# The American STATISTICIAN

The news publication of the  
AMERICAN STATISTICAL ASSOCIATION

JUNE-JULY 1954

Volume 8, No. 3

35 CENTS

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## ARRANGEMENTS FOR ANNUAL MEETING IN SEPTEMBER

Arrangements for the Annual Meeting of the American Statistical Association, which will be held at the Mount Royal Hotel in Montreal, Canada, September 10-13, 1954, are under way. The following people are serving on the Local Arrangements Committee:

Chairman	E. F. Beach	<i>Professor, McGill University</i>
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Publicity	Roger Lessard	<i>Ecole Polytechnique</i>
Exhibits	L. Sherwood	<i>Statistician, Bell Telephone Co. of Canada</i>
Representative of Econometric Society	J. C. Weldon	<i>Associate Professor, McGill University</i>
Representative of Biometric Society	Miss M. G. Russell	<i>Ayerst, McKenna and Harrison, Ltd.</i>
Representative of Institute of Mathematical Statistics	Roger Lessard	<i>Ecole Polytechnique</i>

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Other related societies meeting in Montreal at the same time are the Biometric Society-ENAR, the Econometric Society and the Institute of Mathematical Statistics. The Montreal Chapter of the American Society for Quality Control will also be conducting sessions

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## The American STATISTICIAN

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The news publication of the  
American Statistical Association

Founded 1839

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Hall, University of Pennsylvania, Philadelphia 4.

News and notes should be sent to Dana Barbour, News  
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## LETTERS TO THE EDITOR

Dear Sir:

I was impressed and somewhat pained by the  
article, "Limits of Mathematics in Statistics",  
by W. S. Woytinsky.

...  
I was pained by his passing over many of the  
advantages to the statistician of the mathematical  
attitude. . . . The mathematical attitude should  
improve a person's appreciation of the principles  
of statistical inference. . . .

... It seems to me that what Mr. Woytinsky  
is really exercised about is not the limits of the  
true mathematical attitude in statistics but  
rather, uncritical acceptance of formulas and  
processes that bear the name of mathematics.

Bradford F. Kimball  
Slingerlands, New York

Dear Sir:

I have just read . . . "Limits of Mathematics in  
Statistics". . . .

As I see it, the people who are interested in the  
118 "consumption functions" were trying to make  
something difficult out of an extremely simple rela-  
tionship. The figures, as I read them, simply show  
that, out of their total net new spending power,  
the people save a small fraction and spend all the  
rest. So, if you know how much the net supply of  
new spending power in the nation is, you can ap-  
proximate, rather closely, how much people will  
spend for consumption. . . .

Willford I. King  
New York City

Dear Sir:

... I agree wholeheartedly with the point of  
view which Mr. Woytinsky expressed. . . .

D. E. Paul  
St. Louis, Missouri

Dear Sir:

I have just read Dr. Woytinsky's able article.  
... He should be congratulated on the clearness  
of expression of a particular point of view. That I  
believe he is in error at one point does not detract  
from the excellent analysis. . . .

Stuart A. Courtis  
Professor Emeritus of Education  
University of Michigan

Continued on page 18



# NEWS

**Exhibits and Advance Registration for ASA Meeting—U.N. Statistical Commission Meets—Population Conference—Symposium at Univ. of North Carolina—Proceedings of Midwest Conference Available**

## **Exhibits Feature at Annual Meeting**

The American Statistical Association will again feature exhibits at its Annual Meeting to be held in Montreal, Canada on September 10-13. The general theme of the exhibit program will be "Modern Machines for Speedier and Better Results". In addition to the booths available for exhibitors there will also be an exhibit library where publishers are invited to display books and other printed material. Anyone interested in reserving space at the exhibit may write directly to: Mr. Warren L. Schriver, Chairman, Exhibit Committee, American Statistical Association, 1108 16th St., N.W., Washington 6, D. C.

## **Advance Registration for Annual Meeting**

Advance registration and hotel reservation forms will be mailed from the ASA office to the membership about the first of July. Members are urged to register in advance in order to save themselves time and inconvenience upon arrival at the meeting.

## **Eighth Session of U. N. Statistical Commission**

The United Nations Statistical Commission held its eighth session in Geneva, Switzerland, April 5-22. All 15 countries represented on the Commission were present—Australia, Canada, China, Cuba, Denmark, France, India, Iran, Netherlands, Panama, Ukrainian SSR, USSR, United Kingdom, United States, and Yugoslavia. The United States delegation consisted of Stuart A. Rice, Assistant Director for Statistical Standards, Bureau of the Budget, who is the U. S. Representative on the Commission; and one adviser—Harry Venneman, Office of Statistical Standards, Bureau of the Budget.

The following officers were unanimously elected for the eighth session: P. C. Mahalanobis (India), chairman; R. Rivet (France), vice-chairman; and Ph. J. Idenburg (Netherlands), rapporteur. Specialized agencies of the United Nations which participated in the session included the International Labour Office, Food and Agriculture Organization, UNESCO, International Monetary Fund, World Health Organization, and International Civil Aviation Organization, some of which were represented by several experts on agenda subjects.

In general, the Commission sought to consolidate the work of implementing international statistical standards previously formulated, rather than promulgating new standards. A summary of the conclusions reached by the Commission on each of the principal items on the agenda is presented in the following paragraphs.

*External trade statistics.* The Commission noted with satisfaction the progress that had been made in carrying out its previous recommendations in this field, and gave preliminary consideration to further recommendations designed to extend the area of international agreement, dealing particularly with specific problems of coverage

(including the treatment of bunkers and ship stores, fish, and ships and aircraft); the problems of defining and distinguishing re-exports in trade statistics; definitions of provenance and destination; and methods of compiling quantum and unit value indexes. No definitive action was taken at this session with respect to any of these matters.

*Index numbers of wholesale prices.* Further consideration was given to this subject in the light of consultations that had taken place since the seventh session, and of the steps taken by a number of countries to review their national practices in this field. It was decided that no action should be taken to recommend a standard system for construction of the indexes, but merely to call attention to the desirability of experimentation by countries in compiling indexes of the sector type.

*Industrial statistics.* The Commission reviewed the status of work in this field and concluded that further recommendations on international standards should await additional study and more general acceptance of its previous recommendations. Suggestions were given to the Secretariat as to future work, dealing particularly with statistics of enterprises, statistics of individual industries, and measurement of the industrial activities of households.

*Distribution statistics.* The Commission took note of the work of the International Chamber of Commerce on this subject and requested the Secretary-General to continue work in collaboration with the Chamber, giving particular attention to the development of basic concepts and definitions suitable for use internationally.

*Social statistics.* Detailed suggestions were formulated for the guidance of the Secretariat of the United Nations, and of interested specialized agencies and other international organizations, as to the direction of future work in the general field of social statistics. Particular attention was given to questions of social stratification, family and household structure, and the distribution of income, but a wide range of other topics was also dealt with. Considerable emphasis was given in this discussion to questions of effort among the several agencies concerned with different aspects of the work.

*Housing statistics.* The Commission took note of a report on developments in this field and discussed some of the methodological problems involved. It was decided that improvement of statistics on housing at the national or local level should receive primary emphasis in any program of work that might be undertaken, and that development of international standards in this field would be premature, except perhaps on a regional basis.

*Education statistics.* A memorandum prepared by UNESCO on "Improving the international comparability of statistics on illiteracy and education" was discussed at some length, and specific suggestions were made on the direction of future work in the field. Particular attention was given to proposed definitions of



literacy and illiteracy, and related questions, as having a bearing on plans for forthcoming censuses of population.

**Measurement of levels of living.** The report of the expert group convened by the Secretary-General of the United Nations in 1953 to consider problems of the international definition and measurement of standards and levels of living was discussed at length by the Commission. There was general agreement that the report represented a distinct step forward in efforts to deal with a very complex and difficult problem, and general endorsement was given to the experts' conclusions and recommendations. Specific suggestions were made for the guidance of the agencies concerned with particular aspects of the work involved in carrying out the recommendations.

**Population census activities.** The status of work in this field since the last session was reviewed and satisfaction was expressed at the progress made. Preliminary consideration was given to steps which should be taken toward development of additional recommendations or revision of recommendations previously made, in anticipation of the next round of population censuses in 1960-61.

**Vital statistics.** The Commission took note of a progress report on work in this field and commented on a number of methodological questions that arose in the discussion. No action was taken other than formulation of suggestions for future work.

**Education and training of statisticians.** Recent developments in this field were discussed and note was taken of the activities of a number of international organizations engaged in statistical education and training programs, including the International Statistical Institute and the Inter-American Statistical Institute. The conclusion was reached that the next session of the Commission would be an appropriate and timely occasion for a comprehensive review and evaluation of the program of statistical education and training as a whole.

**Time reference for agricultural statistics.** In response to a request from FAO for advice on this question, the Commission offered a number of general comments and suggested that further consideration be given to the problem by experts familiar with national and regional practices and interests.

Copies of the full report of the eighth session of the Statistical Commission to the Economic and Social Council may be obtained from the Statistical Office of the United Nations, New York, N. Y.

#### **Proceedings of Midwest Conference on Forecasting Techniques Available**

The Midwest Conference on Forecasting Techniques, the program of which was described in the April-May issue of *THE AMERICAN STATISTICIAN*, was very successful. Attendance totalled 304, with a number of persons from outside the immediate Chicago area. Copies of the proceedings will be mailed automatically to those attending the conference, and may be purchased by other interested persons for \$3.50. Checks payable to the Chicago Chapter, American Statistical Association, should be sent to D. V. Sholes, Room 2300, 1 North La Salle St., Chicago, 2, Ill.

#### **World Population Conference**

A World Population Conference will be held in Rome from August 31 through September 10, 1954 under the auspices of the United Nations with the cooperation of the interested specialized agencies, the International Union for the Scientific Study of Population, and other non-governmental organizations. The Economic and Social Council in approving the holding of this conference decided that it should be devoted solely to the exchange of ideas and experience on population matters among experts in the field. Invitations to individual experts to take part in the conference are being issued to individuals nominated by governments and international scientific organizations.

The topics to be discussed at the conference include: mortality trends, fertility trends, emigration, immigration, prospects for future population changes, demographic aspects of economic and social development (e.g., relation between population and resources), social aspects of population changes, biological aspects of population changes, legislation and administrative programs relevant to population, methods of demographic measurement and analysis, and methods of making population projections. Each subject is in charge of an organizer who is responsible for inviting contributions and for the discussion.

Questions relating to the conference may be addressed to Dr. John Durand, Acting Director, Population Division, the United Nations.

#### **Symposium on Multivariate Statistical Analysis**

A symposium on multivariate statistical analysis was held at the University of North Carolina April 21-24, the first sessions at Chapel Hill and the final one at Raleigh. Some 35 statisticians, psychologists and economists attended. The formally announced participants were Maurice G. Kendall, C. Radhakrishna Rao, Harold Hotelling, S. N. Roy, R. C. Bose, R. L. Anderson, Aleyamma George, Seymour Geisser and Earl Diamond, but numerous others contributed also. Each lecture was followed by extensive discussion. Considerable unpublished material and many new ideas were brought to light in fields such as factor analysis, multicollinearity, discriminant functions and related classification problems, basic criteria for multiple-parameter estimation, canonical correlation, serial correlation, T statistics, and multivariate confidence bounds.

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# Federal Statistical Activities

## Developments in Employment and Unemployment Statistics

### *Combined employment release initiated*

Employment and unemployment statistics compiled by the Departments of Labor and Commerce are now being released to the public in a combined report each month. This step has been taken to improve general understanding of the Government's figures on the employment situation. The first joint release was issued May 7, 1954, containing April figures. Although every effort is being made to speed the joint release, a slight delay in publication of some of the figures results from combining information from different sources.

Arrangements for the joint release were worked out between the Departments of Commerce and Labor with the assistance of the Council of Economic Advisers and the Bureau of the Budget.

The need for an integrated report on employment and unemployment in the United States was stressed in the *Report of the Joint Committee on the Economic Report*, issued in February. It stated that "information on the labor force, employment and unemployment collected by the Departments of Labor and Commerce should be brought together, and analyzed in one integrated report regularly published, which would clearly set forth the information given in these separate sets of data."

More detailed information than can be included in a single combined release continues to be issued individually by the compiling Bureaus as supplements to the joint release.

Each of the different types of information supplied by the two Departments contributes to an understanding of the employment situation. Figures from the following sources are summarized in the joint release:

Bureau of the Census, Department of Commerce. This Bureau prepares monthly estimates of the population 14 years of age and over classified as employed, unemployed, or not in the labor force, these estimates being based on interviews with a scientifically selected sample of 25,000 households located in 230 areas throughout the country. The employed total includes the self-employed and unpaid workers in family-operated enterprises, as well as all wage and salary workers, and is divided between agricultural and nonagricultural industries. The unemployed include all jobless persons looking for work, whether or not they are eligible for unemployment insurance. Among other things, national estimates are provided by age, sex, color, and other characteristics for all persons in the work force. In addition, estimates of hours worked and occupation are provided for the employed and of duration of unemployment for the unemployed.

Bureau of Labor Statistics, Department of Labor. This Bureau publishes monthly statistics of the number of employees in nonagricultural establishments for the Nation as a whole, for each of the 48 States and D. C., and for more than 100 of the major labor market areas in the United States. The information is provided through a joint Federal-State program from 155,000 employers who supply monthly reports on 20 million workers from their payroll records. These same reports yield information on the number of employed workers, average earnings and hours of work for all major industries in the United States. The BLS data refer to all nonagricultural employees paid for the mid-week

of the month, but do not include self-employed persons, domestic servants, and unpaid family workers.

Bureau of Employment Security; Department of Labor. Weekly data on insured unemployment, based on operating reports from agencies which administer unemployment insurance programs currently covering some 38 million workers or about three-fifths of the Nation's labor force, are issued by this Bureau. These reports present a complete count of jobless workers eligible for unemployment insurance, and show a State-by-State picture of unemployment trends.

Although the joint publication figures on the employment situation may be expected to increase public understanding and reduce chances for misinterpretation, it can not be expected to resolve all differences in levels and trend between series based on household enumeration of the working population and establishment reports of workers on payrolls. Neither can it resolve differences between household reports of persons looking for jobs and data on weeks compensated under unemployment insurance programs. Some inherent differences can be expected to persist.

### *Review of concepts*

The interagency Technical Committee on Labor Force, Employment and Unemployment Statistics, under the chairmanship of Gladys Palmer, consultant to the Budget Bureau, has long been concerned with narrowing the area of differences among the various series. As a step toward improvement and reconciliation of the data, the committee has established a subcommittee to make a careful review and appraisal of the concepts on which the various series are based.

The Subcommittee on Review of Concepts is concerned with estimates of employment and unemployment used as current economic indicators, whether obtained from population enumerations, establishment reports, or administrative records. The review will be concerned not only with obtaining the most useful figures for current analysis, but also with maintaining as much consistency as possible between sets of data which are gathered primarily to answer different purposes. The subcommittee is expected to make a thorough study, taking as much time as necessary.

The following individuals are serving on the subcommittee: Charles Stewart (chairman), Bureau of Labor Statistics; Gertrude Bancroft, Census Bureau; V. S. Chavrid, Bureau of Employment Security; Louis Ducoff, Agricultural Marketing Service; Clarence Long, Council of Economic Advisers; Margaret Martin, Bureau of the Budget; Emmett Welch, Office of Defense Mobilization; Murray Wernick, Federal Reserve; Paul Stanchfield (secretary), Bureau of Labor Statistics; and Gladys Palmer, ex-officio.

### *Commerce advisory committee*

A special Advisory Committee on Employment Statistics, made up of nongovernment experts was appointed in February by the Secretary of Commerce. The committee is headed by Frederick F. Stephan of Princeton University, and includes Lazare Teper, International Ladies Garment Workers' Union and Lester R. Frankel, Vice-President of Alfred Politz Research, Inc., with William G. Cochran of Johns Hopkins University as an adviser to the extent permitted by prior obligations. The Committee is studying the results of the new sample for the Current Population Survey and will evaluate the methods and procedures used in the survey.

MARGARET E. MARTIN,  
Office of Statistical Standards,  
Bureau of the Budget

## New Subcommittees of the Joint Committee on the Economic Report

Representative Jesse P. Wolcott, Chairman of the Joint Committee on the Economic Report, announced on April 16th the appointment of the two subcommittees provided for in the Joint Economic Report of February 26th, of which parts relating to statistics were summarized in the April-May AMERICAN STATISTICIAN. The subcommittees and the members appointed are as follows:

### *Subcommittee on Economic Statistics.*

Representative Henry O. Talle (Chairman)

Senator Frank Carlson

Representative Richard Bolling

### *Subcommittee on Economic Stabilization.*

Senator Ralph E. Flanders (Chairman)

Senators Barry Goldwater and

J. William Fulbright

Representatives Richard M. Simpson and

Wright Patman.

JOHN LEHMAN, Clerk,

Joint Committee on the Economic Report,  
U. S. Congress

## Historical and Descriptive Supplement to Economic Indicators

A 63-page Historical and Descriptive Supplement to *Economic Indicators* has recently been released by the Joint Committee on the Economic Report. The Supplement contains a brief description and table of historical data for each series in the monthly publication. It was prepared by the committee staff with the assistance of the Bureau of the Budget and agencies compiling the data for *Economic Indicators*.

The report is intended to answer most of the requests for general information which cannot be carried each month in the publication but which is often essential to the interpretation and use of the current materials. The descriptive material attempts in a nontechnical way to explain how the series is derived, its limitations, the uses for which it is appropriate or warning of uses for which it is especially not appropriate. References to detailed explanations are provided for persons who wish to go more fully into any particular series.

Copies of the Historical and Descriptive Supplement are available from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., at 35 cents each.

JOHN LEHMAN, Clerk,

Joint Committee on the Economic Report,  
United States Congress

## California Health Survey

The Bureau of the Census is currently undertaking a one-year statewide morbidity survey for the California Department of Public Health. Each week, beginning the week of May 3, 1954, and continuing for 52 weeks, a sample selected to represent the entire State of California will be interviewed to obtain information about illness, accidents and injuries during the preceding four weeks; chronic diseases, impairments and handicapping conditions; and hospitalization during the preceding year. For each condition reported, respondents will be asked about medical attendance, disability and related questions. Information will also be ob-

tained about veterans status, sick leave, health insurance coverage, migration and family income, as well as the usual demographic characteristics. The sample will be drawn from the entire population, including persons in institutions, with the exception of persons residing on military installations. Altogether, a total of about 12,000 households will be surveyed. It is hoped that additional subjects can be dealt with by means of supplements to the questionnaire from time to time during the year.

The plans for the survey are based on the results of an intensive methodological research study carried out by the Bureau of the Census in San Jose for the California Department of Public Health.

The California Department of Public Health is planning a monthly publication program to report selected morbidity statistics from the survey on a current basis during the year. Further information concerning the publication program can be obtained by writing to Dr. Lester Breslow, Chief, Bureau of Chronic Diseases, California Department of Public Health, 2180 Milvia Street, Berkeley 4, California.

JACK B. ROBERTSON, Chief,  
Field Division,  
Bureau of the Census

## Surplus Census Reports Available

Because of reduction in storage space, it is necessary for the Bureau of the Census to dispose of a portion of its supply of reports of the censuses of population and housing. Copies of the paper-covered first, second, third, and fourth series population reports for 1940, as well as the first, second, third, and fourth series housing reports for 1940 are available for some but not all of the States. In addition, copies of the buckram-bound editions of 1940 Population Volume I; Parts 2, 6, and 7 of Population Volume II; the United States Summary of Population Volume II; and all three parts of the 1940 Housing Volumes III and IV, including Part 1 of each volume which is the United States Summary, are available.

Copies of 1940 and 1950 reports on population and housing characteristics by census tracts and of 1940 and 1950 reports on housing characteristics by blocks are available for many of the cities for which such reports were prepared, as well as the 1950 series IIB reports on detailed characteristics of housing for many of the standard metropolitan areas. There is no surplus supply of any of the other reports of the 1950 Censuses of Population and Housing.

The special reports of the 1940 Census, of which copies are available, include the following: State of Birth of the Native Population; Color and Sex of Migrants; Institutional Population; Fertility by Duration of Marriage; Types of Families; Family Characteristics by Tenure and Rent; Family Employment Status; Education, Occupation, and Household Relationship of Males 18-44; Estimates of the Labor Force, 1930-1940; Comparative Occupation Statistics for the United States, 1870-1940; and Housing Characteristics by Type of Structure.

While the supply lasts, the Bureau is willing to send any of these reports upon request. In some cases it would be possible to supply 25 or more copies of a report which could be used as illustrative material in classrooms. Although no charge is made for the reports, the recipient is requested to pay the postage or express charges on any moderately large order. Requests for any of these Census reports should be sent to the Population and Housing Division, Bureau of the Census, Washington 25, D. C.

HOWARD G. BRUNSMAN, Chief,  
Population and Housing Division,  
Bureau of the Census



# OPERATIONS RESEARCH AS A SCIENCE

JOHN B. LATHROP

*Arthur D. Little, Inc.*

During the last few years, the term "operations research" has been applied to a growing body of investigative activity directed at problems of decision and management in many areas of business, industry, and government. Operations research has been described as the application of the scientific method to problems of executive decision where it has not previously been employed but where it can be proved useful. This broadening of the range of application of the methods of research is so great that some say it requires the appellation of a new branch of science.

Meanwhile, many who are engaged in established areas of science and engineering, particularly those concerned with problems of processes, production, or marketing wonder where operations research fits into their activities. Systems engineering, industrial engineering, market research, etc., provide quantitative methods for selecting executive policies. Underlying these disciplines are methods for detecting and explaining the relationships among the factors affecting a process, many of them based upon techniques developed through research in mathematical statistics, sampling theory, or econometrics. Operations research is certainly closely related to other fields and is often concerned with problems of interest to statisticians.

Perhaps these relationships can best be illustrated by pointing out some of the general characteristics which seem to underlie work typical of operations research, and the role played by statistical theory in some examples.

As in science, the primary objective of operations research is to understand, not to act. When an operation is understood, when the mechanism or systematic organization underlying the observed facts are discovered, the action to improve the process is often fairly evident. It is in the obtaining of this initial understanding that the scientific method comes in.

The scientific method, as referred to in operations research, is a combination of quantitative hypothesis, observation, and controlled experiment which is typical of much of the research in the physical sciences and certainly not unknown in statistical analysis. Its essential elements include the development of a simplified quantitative model of the operation studied

and the testing and refinement of the model by quantitative observation and controlled experiment. Rather than reasoning from the facts to the mechanism, as in some forms of statistical analysis, the operations research scientist more often sets up assumed models in order to deduce phenomena to check against the observed facts. The details of the model are usually expressed mathematically and the consequences of alternative courses of action, inherent in the model, derived by mathematical procedures.

Surprisingly simple models derived in this manner, expressing the effects of a few important factors, can often provide an understanding of very complex operations. Let me take an example used recently by P. M. Morse.<sup>1</sup>

Consider for a moment what was known about the sun and the planets in Newton's time. There was the sun, immensely large, with planets, each of them large masses of matter, rotating, as well as moving, about it. Most of them had moons moving around them in extremely complicated paths. On the surface of at least one, the earth, were objects moving about, tied to its surface by the force of gravity. How could a simple, mathematical model be set up which would predict these complicated motions? How could we abstract from this bewildering detail the few essential elements of the motion?

Newton was, of course, aware of the mass of accurate observations made by Tycho Brahe on the motions of the planets. He knew that Kepler had reduced this mass to a set of empirical laws of motion; that a planet's path was approximately that of an ellipse, with the sun at one focus, that the path of the moon relative to the earth was also an ellipse with the earth's center at a focus, and so on. These empirical laws enabled one to calculate and predict eclipses and planetary positions. But they were not yet science. We had not yet reached an understanding of the phenomenon. The next step is the essence of the scientific method, the matching of the data to a

<sup>1</sup> "Operations Research—An Application of Scientific Method", *Technology Review*, May, 1953.

mathematical concept or pattern. Newton had to relate the data to its underlying causes, not just determine its pattern.

Newton's first contribution was the concept of a force acting between the planets. To make it quantitative he had to express the consequences mathematically, and to do this he had to devise the language of differential calculus. He then could show that *if*, for example, the earth and moon were both mass points and if they were attracted by an inverse-square force, then the point representing the moon would actually move in an elliptic path as required by Kepler's laws. Moreover, he could show that the amount of force required to make the mass-point moon travel the way the actual moon travels also "explained" the force of gravity on the surface of the earth. To be more explicit, he found that if he computed the magnitude of the inverse-square force at a distance from a point-earth equal to the actual earth's radius, then the force came out roughly equal to that actually acting on bodies at the earth's surface. The check was not too good at first because his early data on the earth's size were not very good; when better survey data were used, the check was quite satisfactory. He then had a mathematical model of the planetary system which duplicated Kepler's laws and at the same time tied in with the force of gravity at the earth's surface.

But at what a sacrifice of detail! He had point masses instead of planets. Perhaps Saturn might seem a point mass to the sun and vice versa, but was the earth a point mass to a man on its surface, or even to the moon? This oversimplification bothered and discouraged Newton so much that he delayed publication of this theory until he could clear it up. He had to substitute for the inverse-square force between point masses the idea of an inverse-square attraction between each portion of mass in the universe, and then had to show that a sphere of such attracting matter had the same attraction for a mass outside it (or even on its surface) as if it were a mass point. This he finally was able to show, though he had to invent integral calculus to do it.

The development of a simplified model, based upon the physical characteristics of the operation itself by physical scientists working with others primarily trained in statistics, has been successful in cases where statistical analysis alone failed or led to wrong conclusions. In a recent investigation of the causes of corrosion in paper mill equipment, large amounts of data were obtained from a survey of many mills, data essentially from an uncontrolled experiment. The number of factors—chemical, physical, environmental, metallurgical—was very large. Variance analysis was extremely useful in determining the relative importance of various classifications of corrosion. It was necessary, however, to develop successive models of corrosion from

first principles of chemistry and metallurgy, in terms of only a few of the possible components, and test them for support by the data, in order to obtain a useful understanding of the situation. For that part of the variation in corrosion appearing among mills, an hypothesis of liquor corrosiveness, based on three of the many components of cooking liquors, explained the bulk of differences in experience, and added greatly to an understanding of the underlying phenomenon. We were able to avoid results like those reported from the purely statistical part of an analysis of data concerning blast furnace operations which showed that the best charge to the furnace would be 100% gravel.

Another example of what we might call a happy combination of operations research and statistical analysis concerned a company which wanted to set time standards for cost accounting and labor control on the operations of a battery of taping machines. These machines wind a variety of protective tapes on steel cables produced by the company. The machines had been purchased at different times and were felt to be rather varied in operating characteristics, although the principle of operation was the same in all. The cable is pulled through the center of a rotating disk, the "taping head", which carries a roll of tape which is unwound through a set of rollers and presented to the cable at an angle. Several kinds of metallic, paper, cloth, and rubberized tapes were used, and the diameter of the cable treated varied widely.

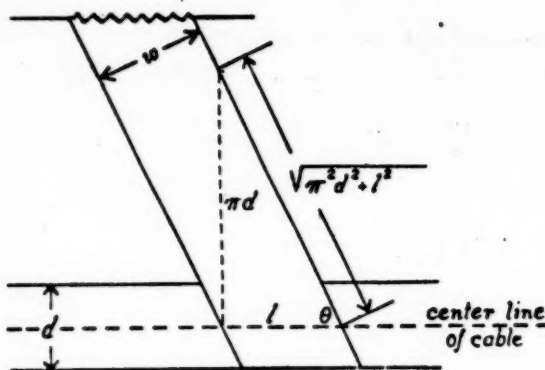
Time study methods had failed to yield adequate standards because of the complexity and variability of the operator's tasks and the uncertain effects of changes in materials. Statistical methods applied to job records of the time and character of jobs failed to explain the variations in time required, and there appeared to be substantial differences in efficiency among machines and operators.

Discussions with operators and foremen indicated that setup and starting time and complexity were largely the same for all jobs, but the workers set the machine speeds from experience and "feel" of what the tapes used would stand without undue breakage. Investigation indicated that the tension in the tape was proportional to its speed and the tensile strength was proportional to its width, so a model was devised to include these relationships.

The simplest unit of production is the amount produced by the machine in one revolution of the taping head, the unit recorded on the work sheets as the "lay" of the tape. If the taping head turns at  $n$  revolutions per minute, the time required for a job is

$$T = t_0 + \frac{L}{nl}$$

where  $t_0$  is setup time,  $l$  is the "lay", and  $L$  is the length of cable in the job.



From the geometrical relationships the velocity of the tape was

$$n\sqrt{\pi^2 d^2 + l^2}$$

where  $d$  was the cable diameter; and the maximum tension the tape would stand was

$$Kn\sqrt{\pi^2 d^2 + l^2}$$

where  $K$  depends on the strength of tape used. The maximum speed of the machine was

$$n = \frac{Q_i w}{\sqrt{\pi^2 d^2 + l^2}}$$

the tensile strength of tape material.

The cable diameter and lay were set independently and an appropriate tape width chosen. The required

$$w = l \frac{\pi d}{\sqrt{\pi^2 d^2 + l^2}}$$

and thus the maximum speed for the machine was

$$n = \frac{Q_i l \pi d}{\pi^2 d^2 + l^2}$$

The time required to cover a cable of diameter  $d$  and length  $L$ , with a tape of material type  $i$ , at a lay  $l$ , would be expected to be, therefore:

$$T = t_0 + \frac{L}{Q_i l} \cdot \frac{\pi^2 d^2 + l^2}{l \pi d}$$

Application of this model to routine job production records, with appropriate allowances for the types of tape material used, showed the operation was surprisingly uniform and the behavior of machines and operators surprisingly similar. Apparent differences were due to unnoticed effects of differences in jobs handled. A direct basis was available for setting uniform and reasonable time standards.

Other models have revealed the relationships between sales promotion effort and sales, between production schedules and production costs, between warehouse stocking procedures and service to customers, between salesmen's compensation plans and profits, and so on. In some, statistical methods played an important part, in others no part at all. Information theory, queuing theory, servomechanism theory, symbolic logic or simple punched card reproductions of an operation have all provided the basis for operations research models.

One more characteristic of operations research which deserves mentioning is its usual concern with a specific problem in a specific setting, a problem which has not yielded satisfactorily to the disciplines and techniques available to those responsible for the operation. Study in statistical and sampling methods, or in econometrics is part of the basic research from which the strictly applied operations research can draw.

To summarize, I think we can say that operations research is a branch of scientific research, which is concerned more with reaching an understanding of an operation than with the relations among the numbers describing the operation. It is usually carried on by teams of people, drawn from engineering, mathematics, and the physical sciences, as well as statistics. In carrying it out, those trained in statistical methods can be important members of the team, and research in statistics and econometrics can produce valuable new tools for operations research.

It certainly is not new, except possibly in the growth of the idea of bringing together the approaches and techniques of many disciplines, to bear on management problems where they had not been used together before. Quite a few mathematicians and physical scientists, displaced into operations research, are having trouble finding a truly descriptive niche in such categorizations as the National Science Foundation Register of Scientific Personnel.

Operations research groups have been formed in quite a few companies, usually dominated initially by a single type of training, then bringing in others. In a company manufacturing small precision instruments the group commenced with an industrial engineering outlook and was concerned at first largely with optimum allocation of machines among operating and maintenance personnel, determining causes of machine down-time, etc. The group has now taken on additional personnel and new problems in quite different areas, such as determination of the best guarantee policy for the company. In one petroleum company the operations research group commenced with a chemical engineering

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# RECENT REVISIONS OF CONSUMER CREDIT STATISTICS\*

HOMER JONES

*Board of Governors of the  
Federal Reserve System*

Consumer credit is all that credit which pertains to the consumer sector as commonly defined in the social accounts. This criterion provides a rough basis or point of departure for the consumer credit statistics currently maintained. It does not provide an exact criterion since there is not complete agreement among the users of social accounting upon correct classifications. Furthermore, the needs of users of consumer credit data or problems of classification make advisable procedures that are not completely consistent with social accounting procedures.

Consumer credit in the broadest and, we believe, most useful sense includes all mortgage debt on houses occupied by the owners. Accordingly, the category of credit which I am here discussing is technically designated as short- and intermediate-term consumer credit.

Consumer credit statistics in their present form came into existence about 1940. They were the product of the Russell Sage Foundation, the National Bureau of Economic Research and the Department of Commerce.<sup>1</sup> Since 1942, responsibility for maintaining this series has been in the hands of the Federal Reserve Board.

Consumer credit statistics are based upon reports from, and the accounting records of, business enterprises, primarily retailers and financial institutions. Since these enterprises do not in the main distinguish in their accounting consumers as such and other borrowers, it is necessary to have them make such a distinction in their reporting and/or to make appropriate adjustments in the figures reported.

The monthly time series on consumer credit outstanding is maintained currently upon a basis of reports from a sample of holders of consumer obligations, and less frequent reports from better samples

and/or periodic or occasional reports from all holders. The most important revision in the consumer credit series since its inception appeared in the *Federal Reserve Bulletin* in April 1953. Technical aspects of the revision appearing in the *Bulletin* article are supplemented by an independent pamphlet.

The primary basis of the revision was the 1918 Census of Business which provided, for the first time since the census of ten years earlier, complete coverage regarding consumer obligations held by retailers. It has also been possible to institute some improvements of method in making current estimates and to provide for some improved reporting in the future.

The revision work was carried on with the advice and counsel of a Federal Reserve System Committee of Experts and a similar committee of experts from outside the System. Advice and suggestions were solicited from a long list of members of the interested public and consideration was given to the public discussion and writing which has been devoted to these statistics in recent years.

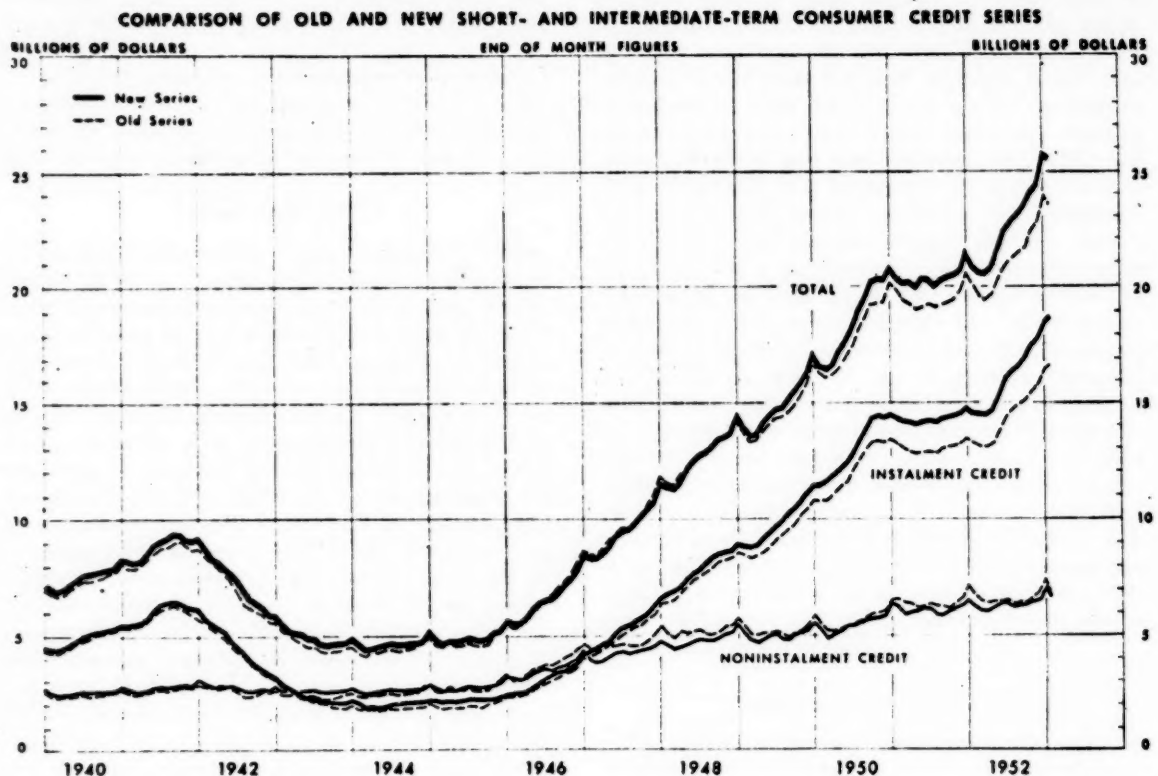
Some conception of the magnitude of the changes resulting from the revision can be gotten from Chart 1. Estimates were revised back to 1910. While substantial changes were made in the estimates, it was found that at no time during the period 1940-52 had the old estimates been misleading as to order of magnitude; neither had the direction nor significance of changes in outstandings been misrepresented by the lack of more frequent complete coverage data. The most significant discrepancies were an underestimate of instalment credit and an overestimate of charge account credit. It is expected that these series will be adjusted annually on a far more accurate basis in the future since the Census Bureau's new probability sample retail trade survey will be used. No revision will again be made for the years prior to 1919. For the subsequent years, further revision may be necessary whenever another retail trade census is conducted or as new information becomes available.

Commercial banks hold more consumer obligations than any other type of business enterprise. At the end of October this year, they held \$11 billion out of a total of \$28 billion of consumer credit outstanding and \$9

\* Presented at the Annual Meeting of the American Statistical Association and the American Finance Association, December 28, 1953.

<sup>1</sup> Holthausen, Duncan McC., Malcolm L. Merriam and Rolf Nugent *The Volume of Consumer Instalment Credit, 1929-38*, National Bureau of Economic Research, Studies in Consumer Instalment Financing, Number 8, New York, 1940.

CHART 1



billion out of a total of \$21 billion of instalment paper. As in the case of most other business enterprises, the consumer as such is not universally and uniformly taken into consideration in maintaining the accounting records of the banks. Indeed, the bankers themselves are not always in a position to know whether a given loan is used for a consumer purpose or another purpose or both. Such is the nature of the commingling or substitution of funds that the borrower himself or a disinterested outsider in possession of all the facts might not be able to say whether or to what extent a loan is used for consumer purposes. It is only through the adoption of some more or less arbitrary conventions that the analyst determines that a certain use of funds is for consumption and that another use is for some other purpose. For example, some analysts may choose to decide that the car which the worker uses to travel to his work or the shoes he wears at work are not being used for consumption. It is against such difficulties of accounting, reporting and conception that estimates must be made of the consumer obligations held by banks.

The basic source of information regarding the consumer obligations held by banks is provided by the periodic "reports of condition" supplied to the Comptroller of the Currency, the Federal Reserve System and the Federal Deposit Insurance Corporation and the State bank supervisory officials by the national banks, the State bank members of the Federal Reserve System, the other State banks insured by the F.D.I.C. and the uninsured State banks respectively. These reports are available every six months for revision of the monthly estimates. Infrequency of complete coverage is not a source of difficulty in estimating the amount of consumer credit obligations held by commercial banks.

Banks are required to report their loans in the following categories:

1. Commercial and industrial loans (include open market paper, but not loans secured by real estate)
2. Loans to farmers directly guaranteed by the Commodity Credit Corporation (made on CCC forms)
3. Other loans to farmers (include loans secured by livestock, but not loans secured by real estate)
4. Loans to brokers and dealers in securities

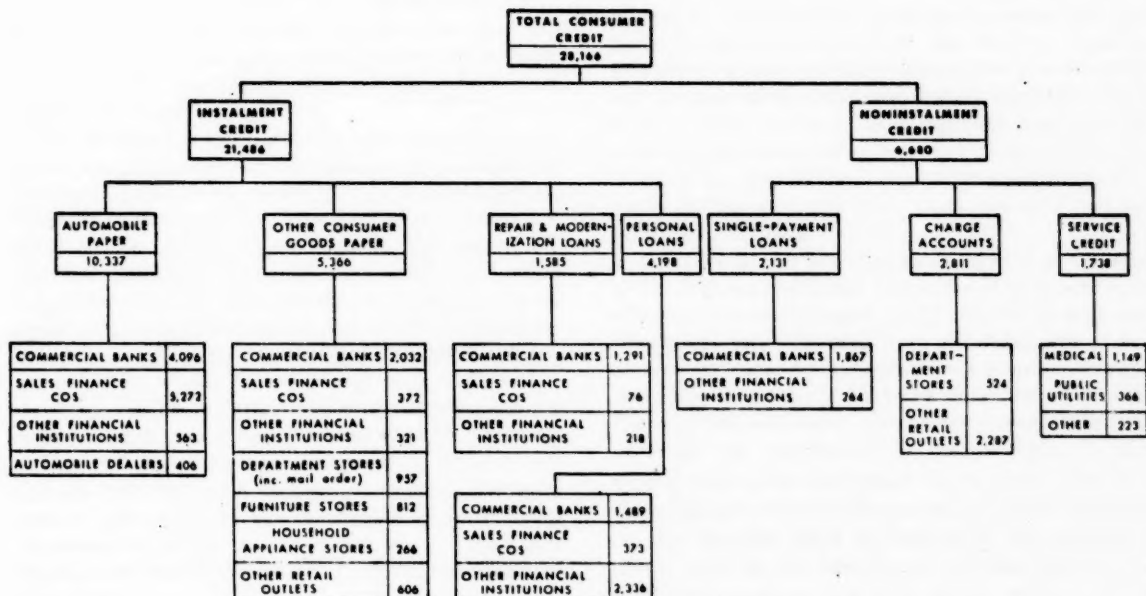
5. Other loans for the purpose of purchasing or carrying stocks, bonds and other securities
6. (a) Real estate loans—secured by farm land (including improvements)
  - (b) Real estate loans—secured by residential properties (other than farm):
    - (1) Insured by Federal Housing Administration
    - (2) Insured or guaranteed by Veterans Administration
    - (3) Not insured or guaranteed by FHA or VA
  - (c) Real estate loans—secured by other properties
7. Other loans to individuals (include all loans to individuals that are not reported against items 1 to 6, inclusive):
  - (a) Retail automobile instalment paper
  - (b) Other retail instalment paper
  - (c) Repair and modernization instalment loans
  - (d) Instalment cash loans
  - (e) Single-payment loans
8. Loans to banks
9. All other loans (including overdrafts)
10. LOANS AND DISCOUNTS, GROSS (total of items 1 to 9)
11. Less reserves for bad debts, unallocated charge-offs, and other valuation reserves
12. LOANS AND DISCOUNTS (item 10 minus item 11)

The logic of this requested classification of loans would seem to indicate that the five sub-categories of "other loans to individuals" should include only consumer loans. However, some banks find it necessary to include in some of these categories loans which should not be classified as consumer paper. Accordingly,

where necessary, an adjustment is made. In 1952, a sample survey was conducted of the loans of 180 banks. It was found that about 5 per cent of the loans reported as "retail automobile instalment paper", 15 per cent of "instalment cash loans", and 55 per cent of "single payment loans" were not consumer loans. Based on information secured from the F.H.A., it was found that about 20 per cent of the "repair and modernization instalment loans" were not consumer loans. In accordance with these findings, appropriate deductions are made from currently reported data. These adjustments which are appropriate for banks as a whole do not apply to each individual bank. Some banks classify all their loans as correctly as possible. Others make erroneous classifications of a very large portion of their paper. No similar study has been made to determine whether and to what extent consumer loans are erroneously hidden in other loan categories where they cannot enter into the estimates.

Consumer loans are somewhat underestimated because instructions to the reporting banks provide that all loans to farmers, whether of a business or of a consumer character, shall be included in loans to farmers. Some banks have partially or completely ignored this instruction, but with respect to "instalment cash loans" and "single payment loans," the adjust-

CHART 2  
SHORT- AND INTERMEDIATE -TERM CONSUMER CREDIT, OCTOBER 31, 1953  
BY TYPE OF CREDIT AND INSTITUTION  
(Millions of Dollars)





ments provide for exclusion from consumer loans of any loans to farmers whether they are of a consumption character or not.

The Board of Governors will continue its attempts to secure more accurate reporting from the banks. In the meantime, continued surveys will enable the making of satisfactory adjustments for misclassifications.

#### **Automobile credit**

The largest single class of consumer credit is automobile paper as indicated in Chart 2. Consumer instalment credit extended for the purpose of purchasing automobiles at the end of October amounted to \$10.3 billion out of \$21.5 billion of total consumer instalment credit. As noted, the surveys have called for a deduction of 5 per cent of the total of such paper reported by the banks as being of a non-consumer character. The estimates of consumer instalment automobile credit include only credit for the purchase of passenger cars by individuals and exclude all credit for the purchase of commercial vehicles, taxicabs, and passenger cars bought by businesses. Credit used by individuals to buy cars which they use in traveling to work and in their work has not been eliminated. There has not been much question but that the use of cars to travel to and from work is a consumption use, just as carfare for this purpose and clothes worn during travel are commonly treated as being in the consumer sector of the economy. With respect to cars bought on the instalment plan by individuals (not businesses as such) and used in whole or in part in their work (e.g., doctors and salesmen) the problem of making the most useful decision becomes more difficult. In making a decision, consideration and weight has been given to the needs of the various users of these data. It has appeared that adjustment of the credit data by some percentage corresponding to the use of their cars in their work by individuals would confuse the data for analytical purposes more than it would help. What is apparently most wanted is the instalment credit used by individuals to buy passenger automobiles. Any arbitrary rule-of-thumb division of this credit into two parts would detract from rather than contribute to analysis of the automobile market and of the business of the financial institutions and would uselessly complicate analysis by division of a quite homogeneous credit category into segments.

#### **Repair and modernization**

Repair and modernization credit is an integral part of the estimates of consumer instalment credit. Both F.I.A. insured loans and other loans of this character are included. Commercial banks are the chief lenders in this field with some paper held by sales finance companies and other financial institutions. Some

question might be raised whether consumer credit of this category should be included with debt on owner-occupied houses or with the short- and intermediate-term consumer debt. For some purposes, it may best be included in house debt and any analysts finding this desirable can do so since it is available as a separate item. For most purposes, however, the repair and modernization is most comparable to other short- and intermediate-term instalment paper. Its maturity is comparable. The average amount of each loan is comparable. It is handled in comparable portfolios, by comparable methods at similar interest rates. The longevity of the object of the expenditure is comparable for a great portion of the paper as in the case of painting and decorating. Some of the objects of expenditure, such as dish washers and water heaters, are identical with, or similar to, those using "other retail instalment paper." The fact that some, or even all, of the repair and modernization paper is used for "capital investment" is scarcely in point in connection with this problem of classification since the great bulk of consumer instalment credit is used to acquire consumer capital, i.e., goods owned by consumers which yield their services or utilities to the consumers over a considerable period of time.

#### **Noninstalment credit**

The distinction between instalment credit and other consumer credit has been continued. This distinction, made since the beginning of the series, is highly important. For many analytical purposes, the regular legal claims upon income provided by instalment credit are most significant. At the same time, it is important for other purposes that data for all the debts of the consumer sector of the economy are available. This is necessary for completeness in the social accounts, for full knowledge of the debt element as a source of or drain upon consumer purchasing power.

Noninstalment consumer credit consists of three parts: charge accounts, service credit, and single payment loans. Charge accounts and service credit are of a rather homogeneous character. Indeed, they might for certain purposes be consolidated under the heading of current accounts or book credit. The category "charge accounts" arises primarily from the sale of goods while service credit derives mainly from the sale of nontangibles. Consumer charge accounts were held as of October 31 by retailers as follows: department stores, \$524 million; food, \$489 million; furniture, \$316 million; automobile dealers, \$144 million; gasoline dealers, \$137 million; and all others \$1,201 million. As of the same date, service credit outstanding in the amount of \$1,738 million consisted of \$1,149 million owed by consumers to doctors, hospitals, etc., \$366 million owed to public utilities and \$223 million of other

service credit. The estimates of medical debts owed are based upon interviews with the debtors. They include only debts owed to the renderer of the service. Debts owed to financial institutions, the proceeds of which have been used to pay doctor and hospital bills or to purchase other services, are included in the personal loans held by financial institutions. The estimates of the amounts owed by consumers to public utilities eliminate business obligations and are net of any advance payments or deposits.

Estimates of single payment loans outstanding are among the most difficult to make at the present time. It was estimated that commercial banks held about \$1,867 million of such consumer obligations and other financial institutions about \$264 million. If banks were able to follow literally the intentions and instructions applying to the report of condition form, their single payment loans to consumers should in a pure form be provided by the item "single payment loans" of "other loans to individuals." But, in practice, many banks have included some nonconsumer loans in this category and an appropriate adjustment must be made for their removal from the estimates. Two surveys of a representative sample of the nations commercial banks gave quite consistent indications that slightly more than half of the dollar amount of loans reported by the banks are not properly in the consumer sector. Accordingly, an amount equal to only 45 per cent of the reported loans are included in the consumer credit estimates.

In revising the consumer credit statistics, loans between individuals have not been included. Surveys of Consumer Finances indicate that this figure may amount to several billion dollars. Possibly, consideration should be given in the future to including estimates of these loans in total consumer credit. For the time being, however, it has been judged best because of both statistical and conceptual problems to exclude this category of loans.

The consumer credit series has never included loans made by life insurance companies on security of policies and the revised series continues this exclusion. There is no doubt that a large part of such loans are for consumer purposes, are repaid, and are in all essential economic respects comparable to other consumer borrowing. The fact that the borrower has an equal or greater claim against the insurance company would seem not to be a controlling consideration since the fact that a bank borrower may have a deposit in the bank has never been considered a reason for not calling a bank loan a loan. The fact that an insurance company may have a legal obligation to make a loan appears likewise to be without pertinence. However, since no practical way has been found of ascertaining the amount of the policy loans which are of a consumer character, it has been necessary to continue omission of these loans.

### Durable goods credit

It cannot be claimed that the categories into which consumer credit has been divided, either before or after the revision, are absolutely ideal for every possible use. It can only be said that they represent what was considered the best possible compromise in view of the data available and the needs of the various users.

One of the most significant aspects of consumer credit is its use to finance the purchase, and in a sense the holding, and therefore the services from, durable consumer goods. One might, therefore, consider desirable the isolation of credit used for the acquisition of durable goods. This is, however, not completely practical. "Automobile paper," "other consumer goods paper," and "repair and modernization loans" very largely constitute credit for the purchase of durable goods. For most analytical purposes, the sum of these three categories would seem to be the most useful series for analysis in connection with consumer durable goods other than housing. Since personal instalment loans in some measure finance the purchase of durable goods, it may be that, for some purposes, they should be included in durable goods paper and that, therefore, total consumer instalment credit is an appropriate analytical tool in relation to durable goods purchases or stocks. Possibly some users can find a basis which is satisfactory for their purposes for including only a part of personal instalment loans.

Some consumer credit other than instalment credit is involved in the purchase of durable consumer goods. Some of the single payment loans are for the purpose of purchasing consumer durable goods. However, it has not proved practical to divide the series into two parts. Charge account credit is also used in considerable measure in the purchase of consumer durable goods but, in view of the relatively limited volatility of this type of credit, its short term character, the relatively small amount outstanding, and the technical difficulties of isolating a durable goods sector, no attempt has been made to this end and most users probably will not suffer from the lack.

The concept of "durable goods credit" is not altogether without ambiguity. Estimates of automobile and other durable goods paper are intended to include only instalment paper "arising from the retail sale of and secured by" automobiles and other consumer durables. But, this requirement that the paper be secured by the durable goods may not be the conceptually best criterion. Its justification is that it helps to give greater assurances that paper which is not wanted in these categories is actually excluded. Literal adherence to the criterion tends to understate the amount of credit used for the purchase of durable goods. Some analytical purposes might be better served if a less

restricted definition were used. The housing debt data are less restricted in that they are not limited to loans for the purpose of purchasing houses.

The consumer durable goods debt may be somewhat understated by virtue of inclusion of part of it in housing debt. Refrigerators, stoves and other such goods are in varying degrees included in the purchase price of houses and financed by the mortgage on the home. In view of the relatively rapid rate of depreciation of these goods, the early years of amortization of house debt might be considered as concentrated on amortizing the part of the debt used to finance the durable goods. For some purposes, analysts may find it desirable to attempt a statistical adjustment recognizing this situation. However, in the recent revision, it did not seem practical to do anything about the matter in the basic series.

Some commentators have reacted to the conceptual and practical difficulties of isolating or estimating consumer credit by suggesting in effect that the whole undertaking be abandoned and that credit be classified on some basis presumably less foreign to the customs and procedures of the holders of the paper. They have suggested classification according to the occupation or other fairly obvious status of the borrower, such as farmer, unincorporated businessman, corporation official, doctor, or wage earner, without regard to distinction as to purpose of the loan. There may be something to be said for this position on two grounds. Some reporters may be able to supply such information more readily. For example, banks may in many instances be able to classify their borrowers but not be able to indicate the purpose of the loan. But this argument works the other way also. Many holders of instalment paper know more about the use of much of their paper than they do about the borrowers. Consider, for example, the paper acquired from dealers by the banks and finance companies.

Classification on a basis of the character of the borrower might be further justified on the ground that the question whether a farmer uses credit to buy a television or to buy a tractor is not significant for most vital economic analysis, that the distinction is not very significant from the standpoint either of the stimuli which cause the purchase and the borrowing or the results of the purchase and the borrowing. But to raise this question is to strike at the roots of the most basic distinctions and conventions of social accounting. If an isolation of consumer credit is not useful, desirable and necessary, the concept of a consumer sector in the social accounts is, in many respects, useless. This possibility goes far beyond the scope of this paper. So long as the consumer sector concept is an integral part of the social accounts and of economic analysis, it will be necessary to do the best job possible of isolating the credit which is used by the consumer sector as such.

From their inception more than ten years ago, the consumer instalment credit data have included figures not only on credit outstanding but also on credit extended and repaid. Until the revision of the outstanding figures in April 1953, the extended and repaid figures were available upon request. Since then, credit extended and repaid as reported by banks and sales finance companies has continued to be released monthly. The over-all estimates of credit extended and repaid are being revised and when computed will be published and maintained monthly.

Several features of these data should be borne in mind whenever they are used for analytical purposes. As in the estimates of the amount outstanding, the estimates of instalment credit extended include any finance and insurance charges included as part of the instalment contract. Similarly, instalment credit repayments include the payments on these charges. The inclusion of finance charges is general for most types of instalment contracts since they are generally written on a discount basis. The inclusion of insurance charges, however, is of importance primarily in the case of automobile instalment credit.

Another type of problem in the use of figures on instalment credit extended and repaid is the inclusion of loans to refinance or consolidate other instalment obligations or renewals of existing loans. These items simultaneously add to both credit extended and credit repaid without affecting the amount outstanding and, consequently, the amount of credit available to consumers. Little is known of the exact amount of such duplicate credit but it is not believed to be sufficiently large most of the time to have any significant effect on the estimates of total credit extended and repaid. Most of the renewals and refinancing occur in the personal instalment loan category and the amounts involved may be large enough to influence the movements in this component from time to time.

The inclusion of the various items described above in the estimates of instalment credit extended and repaid probably cause no serious difficulty for general analytical purposes. The broad trend in the relationship between credit extended and repaid and other economic magnitudes would not be affected most of the time by the inclusion of finance and insurance charges and renewals although the possibility of a significant change in the relative importance of these items must always be considered. When precise relationships are attempted, however, considerable difficulty arises from the lack of comparability between the credit data and other economic measures. For example, in attempting to measure the extent to which instalment credit is used to finance the purchase of automobiles, adjustments are required, not only in the estimates of credit

Continued on page 34



# LIMITATIONS OF CONSUMER CREDIT STATISTICS\*

ERNST A. DAUER

*Household Finance Corporation*

Homer Jones' article describes the revision of consumer credit statistics of April, 1953, and carefully discusses many of the problems encountered. A review of the revision leads me to conclude that the staff members at the Federal Reserve Board, the committee from the Federal Reserve system, and the outside consultants have done a great deal of work and have succeeded, on the whole, in distinctly improving the accuracy and coverage of the estimates. The group seems to have approached the problem without any bias as to whether consumer credit may be good or bad, and attempted to provide figures which would make it possible to study the consumer credit area more thoroughly than had been possible in the past. It is no criticism of their technical competence or of their intellectual honesty that weaknesses remain in the published estimates and that the statistics do not provide all the information which should be available about the consumer credit area.

I have been assigned the task of setting forth the weaknesses and limitations of the consumer credit statistics. To do so thoroughly would require a discussion of each individual component of the consumer credit series, item by item, an appraisal of the relevance of each segment measured, and a consideration of the appropriateness of the aggregate and of the breakdowns for all important problems related to the consumer credit area. This is clearly impossible in the space available.

My discussion will be general, therefore, rather than detailed and comprehensive. I will divide the consideration of the available statistics into: (1) definition and content, (2) methods of estimation, and (3) manner of presentation and classification.

## I. Definition and Content

Few people are likely to object to the definition of consumer credit as set forth in the Federal Reserve Board's explanation of its revision of the statistics:

\* Presented at the Annual Meeting of the American Statistical Association and the American Finance Association, December 28, 1953.

"Credit extended to individuals to finance the purchase of consumer commodities and services or to re-finance debts originally incurred for such purposes." All of the elements in this definition are relatively simple and appear to be perfectly clear—"credit", "consumer commodities" and "individuals". However, differences arise just as soon as an attempt is made to apply the definition to prepare a specific series of figures.

It is a relatively simple matter for you or for me, as individuals, on December 31, to list our debts in our capacities as consumers, and to arrive at a total. We know, as a rule, who all of our creditors are. Some difficulties will arise, in that we will not know the amount of convenience credit for milk, telephone, gas, electric, and other utilities, until those bills are rendered. Yet these and other charge account items can be estimated with reasonable accuracy or determined accurately very quickly. It is also relatively simple to decide whether debt to a financial institution was contracted for business purposes, to purchase investments, or for consumption.

The Federal Reserve Board, however, has the task of preparing comparable information for about 52 million spending units whose individual identities are unknown, many of whom could not or would not make such a tabulation for themselves. Furthermore, because of the magnitude of the task, the Board could not possibly collect the information. From a practical point of view, the only course open to the Federal Reserve Board is to attempt to secure the information from the holders of consumer debt. Without a complete census of individuals and businesses, it is impossible to determine who the non-institutional and non-retailer holders of consumer debt are. Thus, there is no information available with respect to certain areas.

Obviously, the bulk of consumer debt is held by retailers and financial institutions. It cannot be emphasized too often, however, that such holders, in greater or lesser degree, are not in possession of the necessary facts to classify properly each individual transaction and to determine whether it is, in fact, credit extended to an individual in his capacity as a consumer.

It is also impossible to arrive at a universally acceptable consumer credit series because there are legitimate differences in point of view with respect to the inclusion or exclusion of particular items. It is recognized that this occurs because different people expect the figures to serve different purposes. It is less widely realized that difficulty also arises because the consumer credit total figure is used, as a rule, for an altogether different type of analysis than the breakdowns. Even the Federal Reserve Board does not seem to appreciate fully that their decisions on the items to be included for one type of analysis may make it impossible for the resultant figures to serve properly in another analysis.

Let me illustrate: Industry spokesmen frequently criticize the inclusion in the total consumer credit figures of debt covering cars bought by individuals who use these cars wholly or primarily for business purposes (e.g., doctors and salesmen). To those who look upon the figures for total consumer credit, total instalment credit, or automobile credit, as a means of measuring the debt burden resting on consumers and who attempt to relate that burden to consumer income, such criticism appears legitimate. It is reasonable to believe that the payments on passenger cars made by such individuals are, wholly or largely, a form of business expense rather than a charge against consumer income.

Mr. Jones justifies the current practice, in the following words, in his paper: "What is apparently most wanted is the instalment credit used by individuals to buy passenger automobiles. Any arbitrary rule-of-thumb division of this credit into two parts would detract from rather than contribute to analysis of the automobile market and of the business of the financial institutions and would uselessly complicate analysis by division of a quite homogeneous credit category into segments." This is a reasonable decision. Yet it seems to me clear that the data cannot serve both uses appropriately. The decision to include such items in the automobile credit series renders the total, which includes that series, inappropriate for certain other uses.

Other examples could be cited with respect to other segments; the conclusion remains unchanged.

Many have also questioned the inclusion in a consumer credit total of convenience credit—which in large part is merely incident to customary methods of transacting business, and is generally very promptly paid—if the total figure is to be used for an analysis of debt burden. Nor is such a total of consumer credit pertinent to a discussion of the possible need for Federal regulation of some transactions in the instalment credit field.

The basic estimates of consumer credit which are published in the *Federal Reserve Bulletin* are limited to the dollar amounts of credit outstanding at the end of

each month. Desirable additions would be figures showing the flow of consumer credit: namely, the amount originated each month, and the amount repaid. The three sets of figures would provide a much more complete understanding of current developments in the consumer credit field than the figures for outstanding credit alone. (The additional figures have become available beginning with the January 1954 *Federal Reserve Bulletin*.)

## II. Methods of Estimation

The accuracy of the estimates of consumer credit outstanding depends upon the coverage of the original or periodic benchmarks, upon the representativeness of the monthly samples, and upon the validity of the adjustments made to the benchmarks and the samples.

The benchmarks for the various segments of the series vary. There is complete, or relatively complete coverage of each segment for a single date between 1918 and 1950, which has been the primary basis for the recent revision. In almost all cases the current benchmarks are superior to those of the original series. For most series, relatively good, or almost complete, coverage also is attained at fairly frequent intervals subsequent to the basic benchmarks. The monthly and annual figures for the older data between the current benchmarks and those formerly used have been calculated by methods which were practical, expedient, and generally reasonable.

For example, complete coverage of obligations held by retailers is provided by the 1918 and the 1939 Censuses of Business. In addition, checks on the projections will be provided by the Census Bureau's annual sample survey of retail trade. The September, 1950, registration statements of registrants subject to Regulation W also provide complete benchmark information on consumer instalment credit held by financial institutions and automobile dealers. Attention should be called to the fact that this benchmark date was during the post-Korean scare buying spree; this may have a bearing upon the adequacy of its use for determining classification factors. In the service credit field, the benchmarks are much less adequate, but are infinitely superior to the information upon which the earlier estimates were based.

Commercial banks hold about \$9 billion of the estimated total of \$21 billion of instalment credit. In addition, they hold most of the \$2 billion of single payment loans. Thus, they are the most important single type of holder of consumer credit. On the surface the estimates provided for commercial banks appear to be the most thoroughly grounded of any of the series. A benchmark is available every six months, based upon loan schedules forming a part of the "reports of condition" (or balance sheets) submitted by

all insured banks to the bank supervisory authorities. These semi-annual condition reports are prepared pursuant to relatively detailed instructions, issued jointly by the three Federal bank supervisory agencies. Each of the five categories of instalment credit is separately defined. The monthly sample is relatively substantial and covers the same five breakdowns. It would seem that these benchmarks and these monthly reports would have the best possible chance of being accurately reported.

Yet, from a practical point of view, the whole procedure involves guesswork, or highly subjective determinations, on the part of bankers with varying degrees of technical competence, in fourteen thousand banks of varying sizes. In the first place, the banker frequently does not know the use of each loan at the time it is made. Unless it clearly is to a business firm, to a farmer, consists of a real estate mortgage, or is for the purpose of carrying securities, the instructions provide for its classification as a loan to an individual, i.e., a consumer. Thus, even if the report of condition were prepared at the time when the loans were made, the consumer credit section of the loan schedule would partake to a considerable degree of a "catch all" or "not elsewhere classified" character.

However, the condition reports are prepared semi-annually and are composed of the current loan balances. In the smaller banks, whose accounting systems may not involve a high degree of asset or loan breakdown, there is considerable danger that the loan classification is wholly subjective. I know, based upon 10 years of experience at the Federal Deposit Insurance Corporation, that many respondents give whatever figures are easiest at the time. In larger banks, the accounting breakdown tends to be more detailed. But the larger banks are also those which have separate instalment credit departments. Those instalment credit departments usually service all paper which is payable in instalments, business as well as consumer credit. Accounting controls covering such departments are based upon operating convenience and do not tend to distinguish consumer from non-consumer credit.

The Board has applied a correction factor to exclude the non-consumer portion from the reported figures in the benchmarks and the monthly samples. This correction factor is based upon a survey made in June, 1952. It covered 150 banks out of almost 14,000 or about 1%. It involved an examination of the banks' records on 8,200 personal instalment loans and 8,700 single payment loans and a query to the banks regarding their retail automobile instalment paper. The number of banks and the number of loans in this survey were very small and have been criticized as wholly inadequate. Whether this criticism is warranted depends upon the exact methods used in selecting the banks and the individual loans in the sample. Attention is called

to the fact that a single survey was made; the validity of using its finding over the 13 year period from 1939 to the present time, and into the indefinite future, is questionable.

Contrast this procedure with that used in the case of sales finance companies. In this series, a relatively complicated procedure has been used to exclude commercial vehicle paper from the reported total of automotive paper, based upon the estimated maturity of the various types acquired by the companies. These calculations are made monthly on the basis of the changing mixture of paper acquired. Yet in the case of commercial banks, where the aggregates involved are much larger, the corrections for non-consumer paper (in all except the repair and modernization area) are based upon the single survey made in the summer of 1952, involving a sample which seems inadequate. Also the correction factors, so derived, have been applied uniformly to the bank data throughout the entire period of the series. This procedure seems to have only the merit of expediency.

As has been mentioned earlier, the very important segment of automobile purchase credit has not been adjusted for those passenger cars purchased by individuals, such as physicians and salesmen, wholly or predominantly for business use. Some estimates indicate that such use is very substantial.

For the most part, the monthly samples appear of adequate size and composition to be representative. Whether that continues to be true over substantial periods of time, beyond the various benchmark dates (1918-50), is subject to question. Certainly the shopping center development casts doubt upon the continued adequacy of the department store sample. In other areas, too, competition is bringing important changes. These affect the adequacy of the samples and of the methods by which the Board classifies, by type of credit, the total outstandings reported by those samples.

### III. Presentation and Classification

The presentation of data in the *Bulletin* represents a distinct improvement over the old tables. This is particularly true of the functional breakdown within the instalment credit sector into (1) three types of credit for the purchase of goods and services, (automobile paper, other consumer durable goods paper, and repair and modernization paper); and (2) personal loans, which are not for the purchase of goods or services. The old distinction was between sale credit (i.e., credit originated by the retailer), on the one hand, and loan credit regardless of its function, on the other hand. This distinction, the significance of which was chiefly legal, was less useful for analytical purposes and was constantly misused by financial writers and trade and economic analysts.



Other basic tables break down the amount of instalment and non-instalment credit, respectively, according to holder.

In connection with the breakdown by holders, one decision with respect to classification is of particular interest. This was the decision to treat sales finance companies on a consolidated basis, thus including the operations of cash lending subsidiaries. These cash lending subsidiaries include companies classified by the Board as: companies operating under effective small loan laws, industrial loan companies and miscellaneous lenders. This decision results in a situation in which the largest holder of personal instalment loans is the group designated as "all other". There is no way of obtaining a satisfactory annual benchmark of this "all other" group, or of an accurately determinable portion thereof.

On the other hand, if sales finance companies were *not* treated on a consolidated basis, then it would be possible to have an accurate series for the *largest single holder* group of personal loans composed of companies operating under small loan laws. For the latter, an annual benchmark is available in the form of reports of state authorities supervising such operations. In my opinion, the present classification is unwise and should be revised.

The stated objective of the Board is to present the body of data in such detail that it can be taken apart and put together by analysts with various interests and various types of problems. To attain this objective, it would be desirable to have much finer break-downs than are now provided. In some cases the catch-all or "all other" category is of large proportion. In the case of "charge accounts", the "all other" category is more than four times as much as the only specific breakdown, that of "department stores and mail order houses". In the case of "personal instalment loans", the "all other" category accounts for a little more than one-half of the total.

I realize that the "all other" category is used primarily because the Board does not now have sufficient data available to provide finer break-downs. However, the Board could obtain finer breakdowns in some areas, I believe, merely by asking for them, and by presenting a program showing how such detail would be beneficial.

#### IV. Conclusion

In conclusion, let me reiterate: the recent revision has distinctly improved the accuracy and coverage of the consumer credit estimates and reflects a high degree of technical competence. In fact, the consumer credit statistics, even with their shortcomings, are substantially better than the statistics available in most economic areas, whether compiled by the Federal Government or by private business.

I am concerned, however, about the broader, non-technical aspects of the problem. All economic statistics have serious limitations. Differences to be measured are differences of degree, not of kind. Hence, at the periphery, all classification is subjective. The lines of demarcation are fuzzy, not clear. Furthermore, every problem really requires its own set of statistics if they are to be truly germane.

Yet most of the users of government statistics, including those in high places, have not had formal training in the preparation, analysis, and shortcomings of statistics. The mere issuance of estimates by a Federal government agency—in the eyes of many non-technicians—surrounds them with an aura of accuracy and precision which seems to place them beyond question. The long and detailed description of sources and methods used in the revision of the consumer credit statistics constitutes a disclaimer of accuracy. Yet I wonder if it is not the responsibility of the issuer of such statistics to attach to them directly, a clear concise and simple disclaimer which will dispel the mirage of infallibility?

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#### LETTERS TO THE EDITOR—continued from page 1

Dear Sir:

Mr. Woytinsky's article . . . certainly helps to make articulate the essential differences between what the statistician in the social sciences does and what his colleagues in mathematical statistics think he should be doing. . . . I compliment Mr. Woytinsky not only for taking the time to prepare this article, but also for doing such an excellent job.

It might be added that the article is very timely. With the ascendancy of the mathematical statistician during the War years, when the economist

found his data marked "Confidential" or "Secret", there has been an increasing tendency for the mathematical statistician to up-grade his own work relative to that of what the government calls the "statistical analyst" and "survey statistician". Recently I have discerned some revolt against this attitude, and Woytinsky's article should help both sides to see that there is some basis for controversy.

Frank A. Hanna  
Professor of Economics  
Duke University

# REPORT OF THE AD HOC COMMITTEE ON STATISTICAL STANDARDS

**Secretary's Note:** At the meeting of the incoming Board and Council of December 29, 1952, the Committee on Committees submitted for consideration an outline regarding the tasks that should be undertaken by the Commission on Statistical Standards and Organization. The Board authorized President Cochran to appoint an ad hoc committee to explore the functions as outlined by the Committee on Committees. The ad hoc committee, under the chairmanship of Rensis Likert, Institute for Social Research, University of Michigan, has prepared an excellent report on this subject which should be the concern of all members of the Association.

The whole problem of standards in the statistical profession is a great and difficult one. The Board has authorized the publication of the ad hoc committee's report in *The American Statistician* in the hope that the members of the Association will submit their views regarding both the Report and the problem of standards. The entire ASA membership is invited to forward their thoughts and comments to the Office of the Secretary of the Association for possible publication in *The American Statistician*.

The task assigned this Committee is best described by quoting from President William G. Cochran's letter to Committee Members and from the notes of the December 1952 meeting of the incoming Board of Directors. The following paragraph appears in the notes of the meeting:

The question of whether the ASA should undertake to set standards was discussed. Mr. Tucker felt that a set of ethical standards is needed and that this association is the only one in the country that is in a position to propose a code of professional ethics. Mr. Marshall pointed out that other bodies, such as the U. N., are formulating standards, and that our failure to work with them would lead to confusion. Mr. Hoadley felt that the ASA should not bow to the standards of others, by default. Mr. Haenzel felt that any group which speaks in the name of the Association should be very close to the governing board, and that the appointment of a permanent committee to act in this matter would constitute an abdication of authority. Prof. Wallis felt that it would be unwise and objectionable for the Association to put the weight of its authority behind controversial standards, or to take sides in areas where there is no general agreement. Mr. Hansen concurred, and suggested that the Association should have discussion going to formulate noncontroversial standards, and to outline the areas of controversy and the issues involved.

From Dr. Cochran's letter:

At the December meeting of the Council I was instructed to appoint an ad hoc committee to give the Board some advice on the matter (of statistical standards). The issue is a thorny one, on which there is considerable variance of opinion.

There is one other facet of the problem. At the request of the Board, the Committee on Committees gave us a statement of the areas in which the Commission on Standards might operate, without spelling out any recommendation. A copy of this report is enclosed. The parts which the Council would like the ad hoc committee to consider are A1 and A2.

Roughly speaking, what we would like to have is: (1) The ad hoc committee's opinion on the advisability of ASA operation in areas A1 and A2, with any specific recommendations about activity. (2) Advice about the best way of operating (e.g. through a Commission or in another manner).

The statement of the Committee on Committees referred to above regarding the areas in which the Commission on Statistical Standards and Organization might operate reads as follows:

## A. On its own initiative

1. Formulate and announce standards to which any published statistical result should conform, as to various essential and desirable points, such as:
  - (a) Definition of terms.
  - (b) Statement of sources and characteristics of raw data used.
  - (c) Universe covered.
  - (d) Methods of measurement and enumeration.
  - (e) Name of statistician responsible for job.
  - (f) How many samples were drawn, and how sampling procedures were applied, in definite enough language to make clear just what was done.
  - (g) Limitations of conclusions; especially sampling and response errors and other qualifications that should be kept in mind in applications.

2. Propose standards of organization and established procedure believed essential or desirable to assure valid statistical results, e.g.:

- (a) Independence of responsible statistician

from control by any organization superior as to methods and conclusions.

- (b) Specification by organization superior, in writing, of what problems shall be dealt with, and desired degree of accuracy. In many fields, to be sure, "degree of accuracy" can be specified only in somewhat broad terms.
- (c) Adoption of general rule that any new method shall be tested on small scale before general use.
- (d) Collaboration on every project of experts on subject matter and experts on method.
- (e) Review of every result before it is finalized by specialists in subject matter, method, and field of application.
- (f) Review of results and their interpretation by a responsible supervisory organization.
- (g) Publication of significantly different interpretations by collaborating specialists and supervisors.
- (h) Publication of reasons for failure to publish results of any study for which public funds have been used or for which data have been secured by a general canvass.

Your committee unanimously recommends that the Association proceed with the establishment of standards for the guidance of individual statisticians. Several of the reasons why this is desirable are mentioned above. An additional reason is that this is a necessary step before any certification procedure for statisticians can be established. Other professions have found that it is necessary to establish criteria of satisfactory behavior before a certification program can operate effectively.

Your committee has not considered the problem of the ASA giving, upon request from an appropriate institution or group, specific advice on standards. The ASA has done this in the past, as for example, to the Bureau of Mines. It is felt that these specific requests should be handled by the Board of Directors as they arise; they are not considered in this report.

#### **Summary of the Ad Hoc Committee's Conclusions and Recommendations**

##### *General Conclusions*

1. It is desirable for ASA to work towards a statement of agreed standards, both technical and ethical, and in both areas A1 and A2. On the whole, agreement may be easier in A1, but incidents involving technical and ethical considerations may arise in both areas.

2. Progressive formulation, extension, and revision as required of agreed standards would be a major and difficult undertaking, requiring (a) availability of a small group of able and strongly-motivated "standards

conscious" individuals prepared to dedicate themselves to this task, (b) continuity of functioning of such a group and (c) provision of adequate facilities for the extensive clerical work and correspondence involved. Available experience and accomplishments of other associations such as the American Psychological Association in respect of standards should be utilized as much as possible.

3. Proposed technical or procedural standards as well as ethical standards will achieve their object only when supported by a substantial majority.

##### *Specific Recommendations*

1. A sample survey should be made to estimate the extent of active or potential support for standards among ASA members. Further action should be taken only if warranted by indicated support and after an appraisal of costs involved. Financial support from foundations might reasonably be solicited.

2. If the formulation of standards is undertaken, this should be the continuing responsibility of a group such as that envisaged in Conclusion 2 above. This group should be organized as a committee of ASA.

3. If a committee is appointed to proceed with the formulation of standards, the following recommendations are made:

- a. Some fields of statistics are more prepared than others to proceed with the formulation of technical standards. The committee should initiate activity first in those fields or specialties which are best prepared to proceed.
- b. In proceeding toward the gradual formulation of technical standards, encouragement should be given to efforts by individuals and groups to codify and define statistical terms and procedures. Moreover, full use of "handbooks" and other material emerging from such efforts should be made by the ASA committee engaged in the formulation of standards.
- c. This committee should concern itself with general principles. Requests for formal ASA opinions on specific questions, such as the validity of the Kinsey statistics, for example, should continue to be dealt with *ad hoc*.
- d. The committee should follow a procedure which will assure that any standards that are formulated will have support from a very substantial majority of ASA members. The procedure that is recommended by the Ad Hoc Committee is described in the next section.

##### **Procedure Recommended for Use in Formulating Standards**

The fundamental problem involved in the establishment of standards, whether ethical standards or tech-



nical standards, was stated by Wallis and Hansen, as reported in the Rapporteur's Notes of the December, 1952, Board meeting.

Prof. Wallis felt that it would be unwise and objectionable for the Association to put the weight of its authority behind controversial standards, or to take sides in areas where there is no general agreement. Mr. Hansen concurred, and suggested that the Association should have discussion going to formulate non-controversial standards, and to outline the areas of controversy and the issues involved.

Your committee feels that these two conceptions of the problem are valid, and that standards, to be effective, must be a codification of practices and principles upon which there is substantial agreement among the members of the Association. Therefore, if the ASA is to establish standards, the procedure used should be one designed to assure consensus.

A method, based upon the "critical incident" technique, has been developed and successfully used for the codification of standards for members of a scientific profession similar to ours. It is this method that the committee recommends be used by the ASA in its establishment of standards. This method was developed by a Committee\* of the American Psychological Association under the chairmanship of Nicholas Hobbs.

The procedure used by the American Psychological Association may be described briefly as follows. Association members (about 7,000 at that time) were asked to submit in writing brief descriptions of specific incidents in their experience involving ethical standards or problems. Over 1100 members submitted such incidents, some concerning violations of ethical or professional practice, some concerning situations of uncertain ethical or professional significance and some concerning incidents of commendable ethical and professional behavior. These were then classified and summarized in terms of the issue underlying each incident. The points upon which there was general agreement emerged as a preliminary statement of ethical principles and standards. These preliminary standards were published, and widely discussed at national, regional and sectional professional meetings. After further revision they were adopted formally by the American Psychological Association, with provision for their

further and continuous revision.\* This entire process required a period of five years.

The American Psychological Association is currently using this method in developing technical standards for the development, distribution and use of psychological tests.† In this situation both psychologists and the publishers of psychological tests are being involved in the discussions. The participation of the publishers is being obtained because of the influence they have on practice and also because they may hold a different view on some issues.

The essential features of this approach to the development of standards are: (1) the use of the critical incidents method for establishing the issues—as seen by Association Members—on which standards are needed, and indicating the degree of consensus, (2) reliance upon widespread participation by members in the process of developing the standards.

As this brief description suggests, the development of standards by such a method requires a substantial expenditure of effort, and involves broad cooperation from Association Members. Consequently, your committee recommends that no attempt be made to establish standards unless there is widespread interest among the ASA membership in such standards and a genuine desire to establish them. This desire need not have been verbalized but it must at least be present or potentially present among the membership. A first step, therefore, is to test the level of active or potential interest in the development of standards among the ASA membership. This can be done through a sample survey. If the level of interest is low, your committee recommends that nothing be done on developing standards at this time, as the result could be little more than a pious statement of limited value. If a sample survey shows, however, that there is a sufficiently active or potential interest among ASA members to warrant undertaking the development of standards, then the committee recommends that a major effort in that direction be undertaken. It also recommends that the method based upon the critical incidents technique be used. Some problems of finance and procedure are described in the following paragraphs.

\* The members of this Committee were:

Stuart W. Cook  
Harold A. Edgerton  
Leonard W. Ferguson  
Morris Krugman

Helen D. Sargent  
Donald E. Super  
Lloyd N. Yepsen  
Nicholas Hobbs,  
Chairman

\* *Ethical Standards of Psychologists*, American Psychological Association, Washington, 1953.

*Ethical Standards of Psychologists: A Summary of Principles*, American Psychological Association, Washington, D. C., 1953.

† American Psychological Association Committee on Test Standards, *Technical Recommendations for Psychological Tests and Diagnostic Techniques: Preliminary Proposal*. American Psychologist, 1952, 7, 461-476.

Any procedure used for developing standards from the experience of the members of the Association involves a great deal of clerical work, correspondence and administration work. This work will cost several thousands of dollars. The American Psychological Association was successful in obtaining a grant from the Rockefeller Foundation to cover such costs and it is very likely that the American Statistical Association can obtain a similar grant from a foundation. The committee to develop standards will require a substantial budget and a foundation grant is to be preferred over using the limited funds of the Association. The committee should, therefore, as its initial activity, assist the Board of Directors in obtaining resources for the undertaking.

The first step in developing standards is to write to all members of the Association asking them to contribute descriptions of incidents of behavior involving statistical standards or problems related to standards. This letter should be clearly and carefully written and adequately tested in advance of its general mailing to be sure that it communicates fully to the members what is desired of them. It should make clear the general range of problems to be included as well as specifications for a suitable brief form of reporting. The range of problems might involve statistical terminology, methods, methodology and procedures, organizational relationships such as those suggested under A2 in the material prepared by the Committee on Committees, and also incidents having to do with the reporting and use of statistical results. It is important to secure a large number of reports on specific incidents and these incidents should deal with all the wide variety of problems which standards for the Association must cover. In asking members to report incidents, it is important also to encourage them to report positive incidents describing commendable or desirable behavior as well as asking them to report unethical or undesirable behavior.

Statistical enterprises are often cooperative affairs with ethical and technical obligations resting on administrators, subject-matter experts, statisticians and others. Any one of these groups can damage or help, hamstring or facilitate, a statistical study. It may be desirable, therefore, in the formulation of technical and procedural standards in certain statistical fields to involve persons who are not statisticians but who perform functions which have an important influence upon statistical studies.

After a number of such incidents have been obtained in writing from the members, the next task is to code or classify these incidents on the basis of the underlying issue involved. The experience of the American Psychological Association in developing such a code would be

of real help. Dr. Nicholas Hobbs,\* who is Chairman of the APA Committee and who had a major part in developing their code, has kindly offered to give assistance to the ASA in the development of a code.

After all the incidents have been classified, it is then possible to derive from them statements of standards or principles. Obviously these initial statements will be of a preliminary nature.

After the preliminary statements on standards are available, they should be published and should be used by the Association to stimulate discussion of revisions and changes that would be desirable. These discussions should be held by the Local Chapters, by Sections, and also by the entire Association in its national meetings. It is very important to allow adequate discussion of the proposed statements and every effort should be made to modify and edit the statements to meet the consensus that emerges from the discussions.

All of the suggestions, ideas, comments, criticisms that emerge in the discussions of the preliminary draft of the proposed standards, should then be used in the preparation of a revised statement. This revised statement of the standards should then be published for further consideration and discussion by the Association; at this stage the statement would be in a form suitable for adoption by the Association after further minor revisions. The final standards that emerge, however, should still be treated as tentative, and adoption should be on a trial basis.

The experience in the American Psychological Association makes clear that this entire procedure will be successful only if it is used to codify the standards or principles upon which there is substantial agreement among the members of the Association. In so far as the committee endeavors to originate standards and impose them on the Association, there is bound to be an adverse reaction and the attempt to originate new standards will almost certainly fail.

Since both technical and ethical standards are a codification of principles and practices upon which there is general agreement among the members of the Association, any statement of standards is necessarily a living document. Consequently it is desirable to arrange to have the statement of standards subject to a periodic review and revision. In adopting any statement of standards for a trial period (such as three years) it will be important to establish a committee whose function it will be to secure reports of experience with the original statement of standards and to review them and recommend desirable changes and also to consider the inclusion of additional statements upon which there

\* Dr. Hobbs met with the Ad Hoc ASA Committee and much of this report is based on information and advice he provided.

appears to be an emerging consensus among the members of the Association.

The statement of procedure just described makes clear that your Ad Hoc Committee is recommending that the ASA undertake a process by means of which standards will emerge from member experiences, rather than having a committee prepare from its own limited experience the statement of standards. This recommendation is based on the conviction that standards will emerge where agreement exists. Moreover, the process recommended will tend to focus constructive thinking on those areas where real differences of opinion exist among ASA members. There is no need to press toward consensus in areas where there are real differences of opinion; it is important, however, that these areas be recognized and that discussion continue until over a period of time consensus does develop.

It is difficult in advance to state the extent to which different statements of standards will be required for the different major areas of statistical application or for the different kinds of agencies or organizations using statistical resources. The procedure proposed will help to indicate the necessity, if any, to deal separately with the different fields and agencies. The frequency of incidents in particular fields or in relation to particular kinds of problems will indicate the character of statement of standards with which the members of the Association are most concerned.

The procedure described makes clear that the committee which undertakes the development of a statement of standards is undertaking a large and difficult task. For any such effort to succeed it is essential that the committee be well chosen. Experience suggests that this committee should be highly motivated with regard to the problem of developing standards. This does not mean, however, that the committee should be monolithic; the main committee (and also especially the committees of Chapters and Sections) should include some statisticians who would act in the character of "Her Majesty's Loyal Opposition."

At least some of the members of the committee

should have a high level of writing ability in order that the statements prepared by the committee and the supporting reports are readable and so clear that they cannot be misunderstood. Another important asset which committee members should have is skill in interpersonal relationships. The essential function that the committee is undertaking is that of extracting from the experience and thinking of Association members points of agreement which the ASA members are willing to have stated as standards, and this will require a great deal of discussion and a great deal of personal interaction. If the committee members lack interpersonal skill, it may well be that their efforts will lead more to a divergence than to a consensus on the part of ASA members.

Experience of other Associations points also to one other recommendation. It is important to keep the enforcement of standards separate from the development and establishment of standards. The committee which is responsible for the establishment of standards and the continuing committee which is responsible for the periodic review and revision of standards should have no responsibility for the enforcement of standards. The enforcement of standards should be placed in the hands of a committee having quite different objectives and different special competencies. It is important, however, for the ASA to appoint such a committee in order to establish a mechanism to encourage adherence to the standards that are formulated.

John A. Clausen  
Herbert S. Conrad  
William W. K. Freeman  
Nicholas Hobbs\*  
John W. Hopkins  
Alfred N. Watson  
Rensis Likert, *Chairman*

\* Dr. Hobbs is not a member of the committee, but generously met with the committee in order to make available to it his experience in developing and using the critical incident technique as a method for developing a statement of standards.

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Reprints of "Principles of Sampling" by Cochran, Mosteller and Tukey, from the March 1954 issue of the *Journal of the American Statistical Association*, 50¢ per copy—orders of fifty or more: 35¢ per copy. Send your order to the

AMERICAN STATISTICAL ASSN., 1108 16TH ST., N. W., WASHINGTON, 6, D. C.



# 114th Annual Meeting of the AMERICAN STATISTICAL ASSOCIATION

*Mt. Royal Hotel, Montreal, Canada, September 10-13, 1954*

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## FRIDAY, SEPTEMBER 10

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10 A.M.-Noon

### THEORY OF SAMPLING FISH POPULATIONS

*Biometrics Section, Biometric Society (ENAR), Inst. of Mathematical Statistics*

**Chairman:** D. B. DeLury, Ontario Research Foundation

**Papers:** COMBINED ESTIMATION METHODS IN SAMPLING FISH POPULATIONS  
by D. S. Robson  
SOME ADMISSIBLE TAG-RECAPTURE PROCEDURES by D. G. Chapman

**Discussion:** E. L. Cox

10 A.M.-Noon

### MEASURING THE EFFECTS OF SOCIAL PAYMENTS ON THE ECONOMY

*Business & Economic Statistics Section*

**Chairman:** Henry Steinhaus, Equitable Life Assurance Society

**Papers:** MEASURING THE EFFECTS ON THE ECONOMY OF PENSION BENEFITS-  
BOTH PRIVATE AND GOVERNMENT by Miriam Clive, National Indus-  
trial Conference Board

MEASURING THE EFFECTS OF UNEMPLOYMENT BENEFITS ON THE  
ECONOMY by Marvin K. Bloom, Research Council for Economic Security  
**Discussion:** D. J. Daly, Dept. of Trade & Commerce

10 A.M.-Noon

### APPLICATIONS IN CHEMISTRY

*Committee on Statistics in the Physical Sciences*

**Chairman:** H. W. Norton, Univ. of Illinois

**Papers:** COMPARISON AND EVALUATION OF ANALYTICAL METHODS by Clyde  
L. Ogg, U. S. Dept. of Agriculture  
DATA SPACING IN OBSERVING A QUADRATIC RELATION by A. de la  
Garza, Oak Ridge National Laboratory  
(Title and speaker on additional paper to be announced.)

**Discussion:** W. J. Youden, National Bureau of Standards  
Carl Bennett, General Electric Company

12:00 Noon Luncheon

### THE BUSINESS OUTLOOK

*General Session*

**Chairman:** Thomas I. Parkinson, Equitable Life Assurance Society

**Speakers:** Canada:—Gilbert E. Jackson, Sentinel Associates, Ltd.  
Great Britain:—(To be announced)  
United States:—Martin R. Gainsbrugh, National Industrial Conference Board

2:00-4:00 P.M.

### THE CANADIAN BALANCE OF INTERNATIONAL PAYMENTS

*Business & Economic Statistics Section*

**Chairman:** F. A. Knox, Queen's University

**Papers:** THE CANADIAN BALANCE OF PAYMENTS by C. D. Blyth, Dominion Bureau  
of Statistics  
THE U. S. AND THE CANADIAN BALANCE OF PAYMENT by Donald  
Heatherington, National Foreign Trade Council  
THE ROLE OF U. S. AND OTHER NON-RESIDENT CAPITAL IN CANADIAN  
INVESTMENT by A. E. Safarian, Dominion Bureau of Statistics

**Discussion:** Donald Marsh, McGill University

2:00-4:00 P.M.

**INCREASING USE OF STATISTICAL TOOLS BY PHYSICAL SCIENTISTS—PANEL**  
*Committee on Statistics in the Physical Sciences*

**Chairman:** Francis R. Del Priore, U. S. N. Engineering Experiment Station  
**Panelists:** W. J. Youden, National Bureau of Standards  
I. Burr, Purdue University  
W. A. MacCrehan, Bendix Corp.  
J. H. Toulouse, Owens-Illinois Co.  
R. O. Swalm, Syracuse University

2:00-6:00 P.M.

**CONTRIBUTED PAPERS—I**  
*General Session*

**Chairman:** George L. Edgett, Virginia Polytechnic Institute  
**Papers:** **SIMULTANEOUS CONFIDENCE INTERVALS DERIVED FROM MULTIPLE RANGE AND MULTIPLE F TESTS** by David B. Duncan, Virginia Polytechnic Institute and Robert G. Bonner, Hercules Powder Co.  
**A TOPIC IN VARIANCE COMPONENTS ANALYSIS** by W. A. Thompson, Jr., Virginia Polytechnic Institute  
**OPTIMUM SAMPLING IN MULTINOMIAL POPULATIONS** by P. N. Somerville, Virginia Polytechnic Institute  
**A NOTE ON THE T-DISTRIBUTION FOR SAMPLES FROM A BI-MODAL POPULATION AND A SKEW POPULATION** by John C. Layman and Ralph A. Bradley, Virginia Polytechnic Institute  
**SOME ASPECTS OF ESTIMATION THEORY** by M. C. K. Tweedie, Virginia Polytechnic Institute  
**VARIANCE HETEROGENEITY IN A RANDOMIZED BLOCK DESIGN** by Franklin Graybill, Oklahoma A & M College  
**ERROR RATES AND SAMPLE SIZES IN MULTIPLE COMPARISONS** by H. Leon Harter, Wright Patterson Air Force Base

2:00-4:00 P.M.

**PROBLEMS ASSOCIATED WITH MASS THERAPEUTIC TRIALS**  
*Biometrics Section, Biometric Society (ENAR)*

**Chairman:** Felix E. Moore, National Heart Institute  
**Papers:** **PROBLEMS IN THE ESTIMATION OF THE POPULATION GROUP SUBJECT TO BENEFIT FROM A MASS THERAPEUTIC TRIAL** by Donovan J. Thompson, Univ. of Pittsburgh  
**PROBLEMS ARISING IN A CO-OPERATIVE RHEUMATIC FEVER STUDY WITH SPECIAL REFERENCE TO THE CLINICAL POINT OF VIEW** by David D. Rutstein, Harvard University  
**Discussants:** John E. Silson, New York City  
Margaret Merrell, Johns Hopkins University

2:00-4:00 P.M.

**UNDERGRADUATE CURRICULA IN STATISTICS**  
*Section on the Training of Statisticians*

**Chairman:** John E. Freund, Alfred University  
**Speakers:** Paul E. Irick, Purdue University  
William C. Hood, University of Toronto  
Paul G. Homeyer and David V. Huntsberger, Iowa State College  
Robert J. Monroe, North Carolina State College  
**Discussion:** Henry Scheffé, University of California  
Boyd Harshbarger, Virginia Polytechnic Institute

4:00-6 00 P.M.

**BASIC CONCEPTS UNDERLYING APPLICATIONS OF STATISTICS**  
*General Session*

**Chairman:** Clayton B. Brown, Bell Telephone Laboratories  
**Papers:** **THE PROCESS OF LEARNING BY EXPERIMENT** by Eugene W. Pike, Raytheon Manufacturing Co.  
**SOME ELEMENTARY ASPECTS OF APPLIED STATISTICS** by Sutton Monroe, Bell Telephone Laboratories  
**Discussion:** John Curtis, New York University  
David C. Haley, Acadia University

- 4:00-6:00 P.M.**      **CONSUMER SURVEY DATA AS A METHOD OF FORECASTING ECONOMIC FLUCTUATIONS**  
*Business & Economic Statistics Section and Econometric Society*  
**Chairman:**      Rensis Likert, University of Michigan  
**Papers:**      **THE PREDICTIVE VALUE OF DATA ON CONSUMER ATTITUDES** by George Katona, University of Michigan  
**THE PREDICTIVE VALUE OF DATA ON CONSUMER EXPENDITURES** by Margaret E. Thomas, Bureau of Labor Statistics  
**HOW SMALL CAN THE SAMPLE BE?** by Nathan Keyfitz, Dominion Bureau of Statistics
- 4:00-6:00 P.M.**      **MULTIPLE COMPARISON AND MULTIPLE DECISION PROCEDURES**  
*Biometrics Section, Biometric Society (ENAR), Inst. of Mathematical Statistics*  
**Chairman:**      John Tukey, Princeton Univ.  
**Papers:**      **A SURVEY OF MULTIPLE COMPARISON PROCEDURES** by Jerome Cornfield, National Institute of Health  
**A SURVEY OF MULTIPLE DECISION PROCEDURES** by Robert Beehoffer, Cornell University  
**Discussion:**      R. C. Bose, North Carolina State College  
W. G. Cochran, Johns Hopkins University
- 8:00-10:00 P.M.**      **ADMINISTRATIVE PROBLEMS IN APPLYING STATISTICS**  
*General Session*  
**Chairman:**      L. P. Diamond, New York Naval Shipyard  
**Papers:**      **RESPONSIBILITIES AND ORGANIZATIONAL PLACEMENT OF THE STATISTICAL CONSULTING GROUP** by S. B. Littauer, Columbia University  
**THE EFFECTIVE APPLICATION OF STATISTICAL METHODS THROUGHOUT AN INDUSTRIAL ORGANIZATION** by E. P. King, Eli Lilly & Co.  
**Discussion:**      Churchill Eisenhart, National Bureau of Standards  
C. West Churchman, Case Institute of Technology
- 8:00-10:00 P.M.**      **ECONOMIC FORECASTING TECHNIQUES—I**  
*Business and Economic Statistics Section and Econometric Society*  
**Chairman:**      Geoffrey Moore, National Bureau of Economic Research  
**Papers:**      **THE DUN & BRADSTREET SURVEYS OF BUSINESSMEN'S EXPECTATIONS** by Millard Hastay, National Bureau of Economic Research  
**THE CURRENT BUSINESS TEST OF THE MUNICH INSTITUTE FOR ECONOMIC RESEARCH (IFO) AND THE ACCURACY OF SHORT-TERM ENTREPRENEURIAL EXPECTATIONS** by Oskar Anderson, Munich Institute for Economic Research  
**Discussion:**      Ralph J. Watkins, Dun & Bradstreet  
Franco Modigliani, Carnegie Institute of Technology

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## SATURDAY, SEPTEMBER 11

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- 8:00 A.M. Breakfast**      **BUSINESS MEETING OF BUSINESS AND ECONOMIC STATISTICS SECTION**
- 8:00 A.M. Breakfast**      **BUSINESS MEETING OF THE SOCIAL STATISTICS SECTION**
- 8:00 A.M. Breakfast**      **BUSINESS MEETING OF THE SECTION ON TRAINING**
- 10 A.M.-Noon**      **INTERNAL MIGRATION AND ECONOMIC GROWTH**  
*Social Statistics Section*  
**Chairman:**      (To be announced)  
**Papers:**      **MIGRATION AND NATURAL INCREASE IN THE REDISTRIBUTION OF POPULATION AMONG STATES, 1870-1950** by Everett Lee  
**LONG TERM TRENDS IN THE STATE DISTRIBUTION OF THE LABOR FORCE BETWEEN AGRICULTURAL AND NON-AGRICULTURAL INDUSTRIES, 1870-1950** by Carol Brainerd  
**REDISTRIBUTION OF MANUFACTURING ACTIVITY BY STATE AND ITS RELATION TO POPULATION CHANGE, 1870-1950** by Richard Easterlin  
**Discussion:**      (To be arranged)



10 A.M.-Noon

**LIFE-TESTING AND SURVIVORSHIP ESTIMATION**

*Biometrics Section, Biometric Society (ENAR)*

**Chairman:** Nathan Mantel, National Institute of Health

**Papers:** SURVIVORSHIP OF RED BLOOD CELLS by M. A. Schneiderman, National Cancer Institute

NON-PARAMETRIC ESTIMATION OF SURVIVORSHIP by Paul Meier, Johns Hopkins University

**Discussion:** J. W. Fertig, Columbia University  
Lila Elvebach, Univ. of Minnesota

9:00-11:00 A.M.

**THE RELIABILITY AND MEANING OF EMPLOYMENT AND UNEMPLOYMENT STATISTICS**

*Business & Economic Statistics Section*

**Chairman:** Clarence D. Long, Council of Economic Advisors

**Papers:** SOME QUESTIONS ON THE MEASUREMENT OF UNEMPLOYMENT by F. F. Stephan, Princeton University

UNEMPLOYMENT STATISTICS AND ECONOMIC POLICY USES by Charles Stewart, Bureau of Labor Statistics

**Discussion:** Angus McMorran, Dominion Bureau of Statistics  
Lazare Teper, International Ladies Garment Workers Union

10 A.M.-Noon

**TIME SERIES - I**

*Committee on Statistics in the Physical Sciences*

**Chairman:** Leo J. Tick, New York University

**Papers:** TIME SERIES IN ELECTRICAL ENGINEERING by Joseph S. Smith, New York University

TIME SERIES METHODS IN AERONAUTICS by Harry Press, National Advisory Committee for Aeronautics

TIME SERIES METHODS IN METEOROLOGY by Hans Panofsky, Pennsylvania State University

**Discussion:** Willard Pierson, New York University  
Murray Rosenblatt, Univ. of Chicago  
Max Woodbury, Univ. of Pennsylvania and George Washington University

10 A.M.-Noon

**MEASURING THE EFFECT OF PENSION FUNDS ON THE ECONOMY**

*Business & Economic Statistics Section*

**Chairman:** James O'Leary, Life Insurance Association of America

**Papers:** GOVERNMENT SECURITIES IN THE CORPORATE PENSION TRUST PICTURE by R. Duane Saunders, Treasury Dept.

CORPORATE SECURITIES IN THE PENSION TRUST PICTURE by Roger F. Murray, Bankers Trust Co.

**Discussion:** R. W. Goldsmith, National Bureau of Economic Research  
Simon Goldberg, Dominion Bureau of Statistics

12:00 Noon Luncheon

**MEETING OF THE BOARD OF DIRECTORS**

*American Statistical Association*

12:00 Noon Luncheon

**STOCK MARKET FORECAST**

*General Session—cosponsored by Montreal Institute of Investment Analysts*

**Chairman:** M. Dutton Morehouse, Brown Bros. Harriman & Co.

**Papers:** THE OUTLOOK FOR RAILWAYS by Pierre Bretey, Hayden Stone & Co.

OUTLOOK FOR CHEMICAL SHARES by Jeremy C. Jenks, Cyrus J. Lawrence & Sons

OUTLOOK FOR INDUSTRIAL SHARES by Paul A. Murphy, Ogleby Norton & Co.

OUTLOOK FOR CANADIAN SECURITIES by Hamilton Bolton, Bolton Tremblay & Co.

12:00 Noon Luncheon

## TRAINING STATISTICIANS TO WORK WITH ENGINEERS

*Committee on Statistics in the Physical Sciences*

- Chairman:** W. J. Youden, National Bureau of Standards
- Papers:** FROM STATISTICS TO ENGINEERING STATISTICS by Robert Beechhofer, Cornell University  
FROM ENGINEERING TO ENGINEERING STATISTICS by Irving S. Burr, Purdue University
- Discussion:** W. A. MacCrehan, Bendix Co.  
G. R. Herd, Aeronautical Radio, Inc.  
Roger Lessard, Ecole Polytechnique  
Brant Bonner, Univ. of Western Ontario

2:00-4:00 P.M.

## RECENT ADVANCES IN GOVERNMENT STATISTICS (PANEL)

*Business & Economic Statistics Section*

- Chairman:** Donald C. Riley, Bureau of the Budget
- Panelists:** Robert Burgess, Bureau of the Census  
Ewan Clague, Bureau of Labor Statistics  
\_\_\_\_\_, U. S. Dept. of Agriculture  
\_\_\_\_\_, National Institute of Health  
Herbert Marshall, Dominion Bureau of Statistics  
W. D. Burrowes, Island Statistician, Jamaica

2:00-4:00 P.M.

## TIME SERIES-II

*Committee on Statistics in the Physical Sciences*

- Chairman:** (To be announced)
- Papers:** ESTIMATION OF SPECTRAL FUNCTIONS OF STATIONARY TIME SERIES by Murray Rosenblatt, Univ. of Chicago  
CROSS-SPECTRAL ANALYSIS OF TIME SERIES by Willard Pierson and Leo J. Tick, New York University  
FACTOR ANALYSIS OF TIME SERIES by Max Woodbury, Univ. of Pennsylvania
- Discussion:** (To be announced)

2:00-4:00 P.M.

## ANALYSIS OF COUNT DATA-I

*Biometrics Section, Biometric Society (ENAR)*

- Chairman:** David B. Duncan, Virginia Polytechnic Institute
- Papers:** SOME LIMITATIONS OF  $X^2$  IN THE ANALYSIS OF COUNT DATA by W. G. Cochran, Johns Hopkins University  
SHORT-CUT FORMULAS FOR THE EXACT PARTITION OF  $X^2$  IN CONTINGENCY TABLES by Allyn W. Kimball, Oak Ridge National Laboratory  
ESTIMATION BY THE PRINCIPLE OF 'LEAST SQUARES' AND BY 'MAXIMUM LIKELIHOOD' by Joseph Berkson, Mayo Clinic
- Discussion:** R. A. Bradley, Virginia Polytechnic Institute  
A. E. Brandt, Atomic Energy Commission

2:00-6:00 P.M.

## CONTRIBUTED PAPERS-II

*General Session*

- Chairman:** Paul N. Somerville, Virginia Polytechnic Institute
- Papers:** MULTIPLE REGRESSION WITH MISSING OBSERVATIONS AMONG THE INDEPENDENT VARIABLES by George L. Edgett, Virginia Polytechnic Institute  
2<sup>2</sup> FACTORIAL IN A LATINIZED RECTANGULAR LATTICE DESIGN by Boyd Harshbarger, Virginia Polytechnic Institute  
ON THE USE OF RANGE INSTEAD OF STANDARD DEVIATION by Gottfried E. Noether, Boston University  
SOME SURVEY EFFICIENCIES OF A DOUBLE SAMPLING DEVICE by Leslie Kish, Univ. of Michigan  
FITTING A COMMON 'K' TO NEGATIVE BINOMIAL COUNTS WHEN THE MEAN DIFFERS FROM ONE SERIES TO ANOTHER by C. I. Bliss, Connecticut Agricultural Experiment Station  
THE USE OF THE DISCRIMINANT FUNCTIONS IN THE ESTIMATIONS OF THE PROPORTION OF CASES IN A GIVEN POPULATION by Garnet E. McCreary, Cornell University  
ANALYSIS OF THE VARIABILITY OF GROWTH OF FILARIAL WORMS by Mary G. Westbrook and J. Allen Scott, Univ. of Texas  
JEWISH DEMOGRAPHIC RESEARCH IN THE U. S. by C. Morris Horowitz

- 4:00 P.M. BUSINESS MEETING OF THE BIOMETRICS SECTION**
- 4:00-6:00 P.M. HOW GOOD ARE CURRENT STATISTICS FOR FOLLOWING ECONOMIC CHANGES**  
*Business & Economic Statistics Section*  
**Chairman:** Stanley Lebergott, Bureau of the Budget  
**Speakers:** William H. Shaw, E. I. duPont de Nemours & Co.  
 (Speaker to be announced)  
**Discussion:** Stuart Barber, Univ. of Manitoba
- 4:00-6:00 P.M. APPLICATIONS IN ENGINEERING**  
*Committee on Statistics in the Physical Sciences*  
**Chairman:** Calvin J. Kirchen, Ford Motor Co.  
**Papers:** (Title to be announced) by Fred C. Leone, Case Institute of Technology  
 MULTIVARIATE ANALYSIS by J. Edward Jackson and R. H. Morris, Eastman Kodak Co.  
 REVIEW OF STATISTICAL APPLICATIONS IN FRANCE by Roger Lessard, Ecole Polytechnique  
**Discussion:** Milton Morrison, Stevens Institute of Technology  
 Marvin Zelen, National Bureau of Standards  
 Brant Bonner, Univ. of Western Ontario
- 4:00-6:00 P.M. TECHNIQUES OF EVALUATION OF PROGRAMS OF NONPROFIT AGENCIES**  
*Social Statistics Section*  
**Chairman:** Nathan Keyfitz, Dominion Bureau of Statistics  
**Papers:** UNITS OF QUANTITY MEASUREMENT IN A CHILD PLACEMENT AGENCY by Edward E. Schwartz, Children's Bureau, Dept. of Health, Education & Welfare  
 QUALITY TESTING OF QUANTITY UNITS IN A PUBLIC ASSISTANCE AGENCY by Walter M. Perkins, Bureau of Public Assistance, Dept. of Health, Education & Welfare  
**Discussion:** Albert Rose, Univ. of Toronto
- 4:00-6:00 P.M. PRACTICAL PROBLEMS INVOLVED IN ORGANIZING AGRICULTURAL STATISTICS IN UNDER-DEVELOPED COUNTRIES WITH SPECIAL REFERENCE TO AFRICA**  
*General Session*  
**Chairman:** Henry Scheffé, Univ. of California  
**Speaker:** W. J. Dixon, Foreign Operations Administration Mission in Libya  
**Discussant:** Roe Goodman, United Nations

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## SUNDAY, SEPTEMBER 12

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- 9:00 A.M. Breakfast MEETING OF THE CHAPTER SECRETARIES AND DISTRICT REPRESENTATIVES**  
*American Statistical Association*
- 10:00 A.M. BUSINESS MEETING OF THE COMMITTEE ON STATISTICS IN THE PHYSICAL SCIENCES**
- 10 A.M.-Noon THE PROGRAM OF THE SOUTHERN REGIONAL EDUCATION BOARD IN STATISTICS**  
*Section on the Training of Statisticians*  
**Chairman:** Boyd Harshbarger, Virginia Polytechnic Institute  
**Papers:** SOUTHERN REGIONAL GRADUATE SUMMER SESSION IN STATISTICS by Gertrude Cox, Univ. of North Carolina  
 INVENTORY OF STATISTICS IN THE SOUTHERN STATES by H. H. Chapman, Univ. of Alabama



10 A.M.—Noon

**NEW APPROACHES TO THE MEASUREMENT OF SAVING AND INVESTMENT**

*Business & Economic Statistics Section*

**Chairman:** Maurice Lamontagne, Laval University

**Papers:** THE FLOW OF FUNDS APPROACH TO SAVINGS AND INVESTMENT ANALYSIS by Daniel H. Brill, Federal Reserve Board  
PERSONAL SAVINGS IN CANADA: DIRECT ESTIMATES, 1930-1953 by Douglas Humphreys, Bank of Canada

**Discussion:** Roy L. Reiersen, Bankers Trust Co.  
J. W. Popkin, Sun Life Co.

10 A.M.—Noon

**ANALYSIS OF COUNT DATA—II**

*Biometrics Section, Biometric Society (ENAR)*

**Chairman:** William A. Thompson, Virginia Polytechnic Institute

**Papers:** TRANSFORMING COUNTED OBSERVATIONS by J. W. Tukey and F. J. Anscombe, Princeton University  
THE INTERACTIONS OF CERTAIN CONTINGENCY TABLES by N. Mantel, National Institute of Health

**Discussion:** R. L. Anderson, Univ. of North Carolina  
M. C. K. Tweedie, Virginia Polytechnic Institute

10 A.M.—Noon

**NEEDED IMPROVEMENTS IN THE U. S. CENSUS FROM THE STANDPOINT OF SOCIAL STATISTICS USERS**

*Social Statistics Section*

**Chairman:** Edward B. Olds, Adult Education Assn.

**Papers:** CITY PLANNING by Henry Cohen, Dept. of City Planning, New York City  
PUBLIC HOUSING by Morton Hoffman, Baltimore Housing Authority  
EDUCATION by Paul Mort and Mitch Brickell, Columbia University  
NEIGHBORHOOD IMPROVEMENT by Albert J. Kennedy, National Federation of Settlements and Neighborhood Centers

**Discussion:** A. Ross Eckler, Bureau of Census  
Howard Brunsman, Bureau of Census  
Morris Hansen, Bureau of Census

2:00-4:00 P.M.

**ECONOMIC FORECASTING TECHNIQUES—II**

*Business & Economic Statistics Section*

**Chairman:** W. E. Scott, Bank of Canada

**Papers:** FORECASTING TECHNIQUES OF THE U. S. DEPT. OF COMMERCE by Louis Paradiso, Dept. of Commerce  
FORECASTING ECONOMIC TRENDS IN LOCAL AREAS by A. W. Gilbert, and A. L. Jackson, Equitable Life Assurance Society

**Discussion:** O. J. Firestone, Dept. of Trade & Commerce  
G. A. Golden, Sun Life Co.

2:00-4:00 P.M.

**THE AIMS AND PHILOSOPHY OF APPLIED COURSES IN STATISTICS**

*Section on the Training of Statisticians*

**Chairman:** H. Fairfield Smith, North Carolina State College

**Papers:** INTRODUCTORY COURSE IN APPLIED STATISTICS FOR STUDENTS WITH LIMITED TRAINING IN MATHEMATICS by C. H. Goulden, Central Experiment Farm (Ottawa)  
A GRADUATE COURSE IN BASIC STATISTICAL ANALYSIS FOR MAJORS OR MINORS IN STATISTICS by R. L. Anderson, North Carolina State College

**Discussion:** Acheson J. Duncan, Johns Hopkins University  
Nathan Keyfitz, Dominion Bureau of Statistics  
James H. Torrie, Univ. of Wisconsin

2:00-4:00 P.M.

**RECENT DEVELOPMENTS IN SURVEY DESIGN—THE REVISION OF THE LABOR FORCE SURVEY**

*Social Statistics Section*

**Chairman:** R. W. Burgess, Bureau of Census

**Papers:** THE REDESIGN OF THE CENSUS CURRENT POPULATION SURVEY by Morris Hansen, Bureau of Census  
CONCEPTS EMPLOYED IN LABOR FORCE MEASUREMENTS AND USES OF LABOR FORCE DATA by A. Ross Eckler, Bureau of Census  
CRITIQUE OF CENSUS LABOR FORCE METHODS AND CONCEPTS by F. F. Stephan, Princeton University

## MONDAY, SEPTEMBER 13

8:30-10:30 A.M.

### APPLICATIONS IN PHYSICS

*Committee on Statistics in the Physical Sciences*

**Chairman:** D. B. DeLury, Ontario Research Foundation

**Papers:** OPTIMAL FILTERING AS STATISTICAL DESIGN by A. George Carlton,  
Johns Hopkins University  
FIXED, MIXED AND RANDOM MODELS by M. B. Wilk and O. Kempthorne,  
Iowa State College

**Discussion:** T. A. Zoellner, General Electric Co.  
\_\_\_\_\_, McGill University

8:30-10:30 A.M.

### STATISTICS ON MOBILIZATION

*Business & Economic Statistics Section*

**Chairman:** Edwin B. George, Dun & Bradstreet

**Papers:** STATISTICS ON MOBILIZATION REQUIREMENTS AND CAPABILITIES  
by Emmett H. Welch, Office of Defense Mobilization  
MOBILIZATION PLANNING IN CANADA by R. Warren James, Dept. of  
National Defense  
INDUSTRIAL STATISTICS NEEDED FOR MOBILIZATION PLANNING by  
William Truppner, Dept. of Commerce

8:30-10:30 A.M.

### POPULATION AND LABOR FORCE ANALYSIS

*Social Statistics Section*

**Chairman:** George V. Haythorn, Canada Dept. of Labor

**Papers:** SOCIAL AND ECONOMIC CHARACTERISTICS OF POPULATION DE-  
PENDENT UPON AGRICULTURE by Louis J. Ducoff, U. S. Dept. of Agri-  
culture  
MIGRATION AS IT FACILITATES OR RETARDS OCCUPATIONAL MO-  
BILITY by Albert J. Bross, Jr., Vanderbilt University  
SOME EFFECTS OF LABOR FORCE CHANGES OVER TIME by Ann Ratner  
Miller, Univ. of Pennsylvania

**Discussion:** Helen Abell, Canada Dept. of Agriculture  
Edwin Goldfield, Bureau of the Census  
William R. Dymond, Canada Dept. of Labor

8:30-12:00 Noon

### STATISTICAL PROBLEMS IN EDUCATION

*Social Statistics Section*

**Chairman:** Francis G. Cornell, Univ. of Illinois

**Papers:** STATISTICS AND THE PLANNING OF EDUCATION OPERATIONS by  
Charles M. Armstrong, New York State Dept. of Education  
STATISTICS AND EDUCATIONAL RESEARCH by Cyril J. Hoyt, Univ. of  
Minnesota

**Discussion:** Frances Crook, World Book Co.  
Sam Duker, Brooklyn College  
Gordon M. Harrington, Conn. State Dept. of Education  
Alice H. Hayden, Univ. of Washington  
Robert Hopmann, Missouri Synod, Lutheran Church  
Tom Arthur Lamke, Iowa State Teachers College  
Gerald V. Lammholm, Educational Testing Service  
Edwin D. Martin, Houston Public Schools  
Lynnette B. Plumlee, Educational Testing Service  
Agatha Townsend, Educational Records Bureau

10:30 A.M.-12:30 P.M.

### BIOLOGICAL CYCLES

*Biometrics Section, Biometric Society (ENAR), Inst. of Mathematical Statistics and Econometric Society*

**Chairman:** J. W. Hopkins, National Research Council (Canada)

**Papers:** POPULATION DYNAMICS by D. A. MacLulich, Royal Canadian Air Force  
STATISTICAL PROBLEMS AND TECHNIQUES IN POPULATION CYCLE  
ANALYSIS by Mark Kae, Cornell University

**Discussion:** L. D. Cole, Cornell University  
D. B. DeLury, Ontario Research Foundation

10:30 A.M.-12:30 P.M.

**WEATHER FORECASTING AND AIR SAMPLING**

*Committee on Statistics in the Physical Sciences*

**Chairman:** Willard J. Pierson, New York University

**Papers:** STATISTICAL METHODS IN METEOROLOGY by Glenn W. Brier, U. S. Weather Bureau

SOME PROBLEMS IN THE DEVELOPMENT OF A SYNOPTIC CLIMATOLOGY by Thomas F. Malone, Massachusetts Institute of Technology

PROBLEMS OF SAMPLING IN AIR POLLUTION STUDIES by George H. Milly, Army Chemical Center

**Discussion:** John W. Tukey, Bell Telephone Laboratories  
Leo J. Tick, New York University

10:30 A.M.-12:30 P.M.

**DETERMINANTS OF PRODUCTIVITY LEVELS**

*Business & Economic Statistics Section*

**Chairman:** Leo Wolman, Columbia University

**Papers:** STABILITY OF PRODUCTION RATES AS A DETERMINANT OF PRODUCTIVITY LEVELS by S. B. Littauer, Columbia University

ALTERNATE LABOR AND MACHINERY COSTS AS A DETERMINANT OF PRODUCTIVITY LEVELS by Seymour Melman, Columbia University

**Discussion:** Leo Wolman, Columbia University  
W. L. Murdock, General Electric Co.

10:30 A.M.-12:30 P.M.

**THE USE OF STATISTICS IN ANTHROPOLOGICAL STUDIES**

*Social Statistics Section*

**Chairman:** Harry Alpert, National Science Foundation

**Papers:** STATISTICS IN COMPARATIVE ETHNOLOGY by Harold E. Driver, Indiana University

THE PROBLEM OF INDEPENDENCE OF CASES IN CROSS-CULTURAL RESEARCH by John W. M. Whiting and Kimball Romney, Harvard University

STATISTICAL AND QUANTITATIVE PROBLEMS IN PHYSICAL ANTHROPOLOGICAL STUDIES by James N. Spuhler, Univ. of Michigan

**Discussion:** Irwin Bross, Cornell University Medical Center  
Jerome Cornfield, National Institute of Health

12:30-4:00 Noon  
Luncheon

**CENSUS TRACT CONFERENCE**

The Montreal Section of the American Society for Quality Control will also be presenting sessions at this meeting. While the full program of that group is not yet available the following papers will be among those presented:

QUALITY CONTROL SKIT by John Pringle, Montreal Section, ASQC  
OPERATIONS RESEARCH by E. L. Leese, Defense Research Board  
PROCESS VARIABLES STUDIES by Paul Cloutier, Du Pont of Canada

*General Session*

**Chairman:** Howard W. Green, Cleveland Health Council

**Papers:** THE BUREAU OF THE CENSUS AND ITS CENSUS TRACT PROGRAM by Robert W. Burgess, Bureau of the Census

THE DOMINION BUREAU OF STATISTICS AND ITS CENSUS TRACT PROGRAM by Herbert Marshall, Dominion Bureau of Statistics

THE DEVELOPMENT OF CENSUS TRACT CITIES IN THE UNITED STATES by C. E. Batschelet, Bureau of the Census

THE DEVELOPMENT OF CENSUS TRACT CITIES IN CANADA by O. A. Lemieux, Dominion Bureau of Statistics

THE NEWER DEVELOPMENTS IN THE USE OF CENSUS TRACTS IN THE UNITED STATES AND CANADA (5-Minute Reports)

Cleveland	Philadelphia	Vancouver
Montreal	Quebec	Winnipeg
Ottawa	Toronto	and others



# PERMANENT ORGANIZATION FOR THE ADVISORY COMMITTEE ON STATISTICAL POLICY TO THE OFFICE OF STATISTICAL STANDARDS, BUREAU OF THE BUDGET

The Board of Directors, at the meeting of May 3, approved the permanent establishment of the Advisory Committee on Statistical Policy to the Office of Statistical Standards, Bureau of the Budget. The following resolution was adopted:

1. That the Committee be continued as a standing committee to be known as the Advisory Committee of the American Statistical Association to the Office of Statistical Standards of the United States Bureau of the Budget. This Committee shall act as a continuation of the Committee which has been in existence during 1951-1954. It is hereinafter referred to as the Committee.

2. That the function of the Committee shall be to consider, at the request of the Office of Statistical Standards, or on its own initiative, or at the request of other Federal agencies on the work of the Office of Statistical Standards, questions of broad policy relating to the statistical programs of the Federal Government, and to advise the Office of Statistical Standards thereon. It shall advise the Office of Statistical Standards by means of reports and recommendations. The Office of Statistical Standards, or the Committee, may at its discretion make public such reports or any parts thereof.

3. That the Committee shall consist of nine members of the Association. They shall be appointed by the President of the Association. Their term of office shall be three years, but any member may be reappointed. After two consecutive terms a member must be off the Committee for at least one year before being reappointed. The members first appointed after the adoption of this resolution shall be so classified by the President of the Association that the terms of one-third shall expire at the end of one year, of one-third at the end of two years, and of one-third at the end of three years.

4. That no person shall serve as a member of the Committee who is at the time regularly employed by the Federal Government. So as to insure an especially high caliber of competence in making objective judgments, a majority of the members shall be presidents, presidents-elect, or past-presidents of the Association.

Other members shall be present or past officers of the Association. Qualifications for membership shall include recognized high standing in the statistical profession and a broad background of administrative experience at policy level.

5. That the officers of the Committee shall consist of a chairman, who shall be a member of the Committee, and who shall be appointed for a one-year term as chairman by the President of the Association, and an executive secretary who need not be a member of the Committee, and who shall be appointed for a one-year term by the President of the Association; either of these officers may be reappointed.

6. That the Committee may from time to time establish appropriate subcommittees, the members of which shall be designated by the Committee and who need not be members of the Committee but shall be members of the Association; the Committee shall determine the terms of office of the members of subcommittees.

7. That the Committee shall determine the time and place of its meetings, in consultation with the Office of Statistical Standards.

8. That the Office of Statistical Standards shall determine what provision shall be made for payment by the Government of the expenses of members of the Committee.

The following persons have been asked to serve as members of the Committee:

William G. Cochran (Chairman)	Ralph J. Watkins
<i>Johns Hopkins University</i>	<i>Dun &amp; Bradstreet, Inc.</i>
Willard Thorp	Howard Jones
<i>Amherst College</i>	<i>Illinois Bell Telephone Co.</i>
Samuel S. Wilks	Walter Hoadley
<i>Princeton University</i>	<i>Armstrong Cork Co.</i>
Isador Lubin	Frederick F. Stephan
<i>United Nations ECOSOC</i>	<i>Princeton University</i>
William F. Ogburn	
<i>University of Chicago</i>	

Mr. William J. Carson will continue as Executive Secretary of the Committee.

# QUESTIONS AND ANSWERS

EDITED BY ERNEST RUBIN

U. S. Department of Commerce  
and American University

*(We are attempting to inaugurate a different type of questions and answers page in this issue of the American Statistician. Our purpose is to stimulate an interest in conceptual and measurement problems which arise in the course of statistical work and which require discussion apart from purely mathematical considerations. It is hoped that our readers will find this approach of interest and value. We are inviting questions of this type.)*

Mr. E. S. Kerber came across the following statement in Harper's Magazine of January 1953: "... the census figures for 1950 show more people in the 65-70 age group in some parts of the country than there were in the 55-60 age group ten years before. What happened? The explanation is... large-scale falsifying of age by older people in order to get social security payments..." Mr. Kerber requested clarification of the census data. We wish to thank Dr. Richard A. Hornseth of the Bureau of the Census for the following reply.

In several segments of the population, the 1950 Census count for the age group 65 to 69 years is unaccountably greater than the 1940 Census count for the age group 55 to 59 years. Several facile explanations of this discrepancy have been offered, but none appears able to withstand close scrutiny. The three States, Arizona, California, and Florida, which show this phenomenon in their total populations have a well-known attraction for the elderly, which would well account for the bulk of the discrepancy. Similarly, the appearance of this phenomenon in the rural-nonfarm area as a whole may be the result of selective migration. At the United States level, however, its occurrence for non-white females requires another explanation since internal migration of the aged is not a relevant factor and international migration is a negligible one.

The greater count at 65 to 69 years than at 55 to 59 ten years earlier for nonwhite females occurred first in the 1940 Census of Population. This timing, in relation to the establishment of the first national social security system in 1935, has suggested to some students that falsification of age reporting on the part of some people in expectation of social security benefits was the explanation for this phenomenon. Yet, the requirements for eligibility under the several State-Federal programs for old-age assistance and under the Federal system of old-age and survivors insurance are so complex and the applications are subject to such rigid checks that it is quite unlikely that a deliberate falsification of age actually would entail some benefit.

Experience with the old-age insurance and assistance programs suggests that some persons are faced with a contrary problem, their earlier statements of age having been falsified downward for reasons of vanity, job security, etc. In fact, a case can be made for the explanation that, as people reach age 65, its significance with respect to social security would lead them to consider it relatively more important to be included in a census and to report their true age. In April 1950, roughly one-third of the aged received some form of social security payments requiring proof of an age of at least 65 as one item for eligibility. Thus, it can be argued that a large segment of the aged had been initiated to the desirability of complete and accurate reporting in the Census. This explanation, of course, would imply that the census count for the group 55 to 59 years a decade earlier is too low, a possibility that cannot easily be dismissed.

The phenomenon of a greater count at 65 to 69 years than at 55 to 59 years a decade earlier is but an extreme case of impossible ratios of the two counts. Impossible ratios occurred in 1940 and 1950 at the United States level for all color-sex groups, the ratio for nonwhite females being merely the largest. The following table shows the ratios for the combined color-sex groups at the United States level from 1910 on, with ratios for adjacent age groups and ratios from the stationary population of the 1939-41 Life Table:

Age as of later census	Ratio of the count for an age group in a census to the count a decade earlier for the group ten years younger					
	1910 1900	1920 1910	1930 1920	1940 1930	1950 1940	1939-41 Life Table
60-64 years.....	.770	.765	.792	.791	.835	.829
65-69 years.....	.760	.742	.781	.819	.856	.763
70-74 years.....	.622	.615	.651	.685	.722	.600

If we take the ratio from the 1939-41 Life Table as a guide, it is apparent from the table above that the ratios at 65 to 69 years are unusually high in 1940 and 1950, moderately high in 1930, and, in 1910 and 1920, still fairly high in relation to the ratios for the adjacent age groups. Thus, it appears that some part at least

of the discrepancy at age 65 to 69 years is probably independent of the effects of recent social security legislation. It may be the case that the count at age 55 to 59 years is persistently low, but this too requires explanation. Hence, the phenomenon of impossibly high ratios apparently is the result of a complex set of causes.

Available independent evidence on whether the 1950 Census count for the group 65 to 69 years is excessive is not very conclusive. The results of the Post Enumeration Survey, conducted as a sample check on the quality and coverage of the 1950 Census, indicate the possibility of a small net upward bias due to misreporting of age; however, this is about offset by a small net underenumeration, that is, an excess of erroneous omissions over erroneous inclusions. Sampling errors and biases do not permit great reliance to be placed on this finding, but some corroboration comes from results of studies peripheral to this subject conducted by the Social Security Administration concerning the reliability of age records in social security applications

and claims. If, however, we accept this finding as truth, then the 1940 count for the group 55 to 59 years must be too low, for which an explanation must be found. Furthermore, the census count for nonwhite females 65 to 69 years is so clearly out of line with the counts for the adjacent age groups above and below that an excessive count certainly seems indicated, though the count may be complicated by error of color classification.

In summary, on the basis of available evidence, it is not possible to establish either the precise extent to which the 1950 count for the group 65 to 69 years is excessive or the extent to which the 1940 count for the group 55 to 59 years is deficient. Thus, an explanation based on a presumed overcount cannot be more than a speculation. In any case, the facts do not seem amenable to a simple explanation. There is no comprehensive discussion of this problem in Census reports. A report is being prepared in Series P-25, however, that will show the residual remaining in the changed size of 5-year cohorts between 1940 and 1950 after allowance has been made for deaths and migration.

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## OPERATIONS RESEARCH—continued from page 8

point of view and first tackled problems of the best product mix for a particular refinery, in the light of its choices of raw materials and of the changing price structure met by its products as they emerged into the market. In another petroleum company, however, the operations research activity has a strong market research flavor, and has been concerned primarily with means for selecting the types and locations of gasoline

service stations in the light of changes in automobiles, highways, and driving habits.

I hear that, in ancient China, the worst punishment that society could devise for the statistician who had committed a crime was to confine him to a cell in which there was only one of everything. I think that such punishment would not, however, be unduly onerous to the operations research scientist.

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## RECENT REVISIONS OF CONSUMER CREDIT STATISTICS—continued from page 14

extended to eliminate the extraneous elements, but also in the Commerce Department's estimates of consumer expenditures for automobiles. The expenditure estimates, as published, include only the dealers' margins on used car sales since the intention is to measure only current product and not transfers of existing goods from one group to another. Also, most of the accessories purchased with new cars are not included in the automobile expenditure estimates but rather in the separate estimates of automobile parts and accessories. Another source of incomparability is the different nonconsumer adjustment made in the two series. These are only the more important problems involved in deriving a precise relationship between these two series. Similar difficulties arise whenever instalment credit extended or repaid is related to any other economic series. Each relationship should be carefully

analyzed to determine the significance of any incomparabilities. Either appropriate adjustments should be made or the analysis should take account of the influence on the comparison of any incomparability for which adjustments are not made.

The consumer credit series have met very satisfactorily a substantial need of economic analysts, businessmen, and Government since their inception more than a decade ago. While basic data have not always been available to maintain the series with the degree of exactitude which might be desired, the figures have never been misleading. They have never misled concerning either the direction of movement or the order of magnitude of change. With more frequent and accurate basic data available, it is expected that inaccuracies which can develop in the future will be even more negligible.



## NEWS ABOUT MEMBERS

**Oscar L. Altman** has changed his position in the International Monetary Fund from Director of Administration to Advisor, Research Department.

**Archie Blake** has accepted a position as Advisory Engineer with the Air Arm Division, Westinghouse Electric Corporation, Baltimore, Maryland. He is working in systems analysis.

**John M. Brown** has been transferred by the Western Electric Company from Kenilworth, New Jersey to Lawrence, Mass., as Department Chief, Planning and Development, Massachusetts Project. He will be responsible for planning and development of manufacturing methods and facilities for all carrier systems, microwave, crystals and power equipment.

**P. C. Clarke** has been appointed Executive Vice-President of the Hunter Spring Company, Lansdale, Pennsylvania.

**James Eastcott** is now Statistician at the Maitland Works, Textile Fibres Division, of Canadian Industries, Ltd.

**Abbott L. Ferriss**, Chief, Human Relations Division, Human Resources Research Institute, Maxwell Air Force Base, Montgomery, Alabama, has been transferred to Randolph Air Force Base at San Antonio, Texas.

**Milton C. Forster**, who has been Acting Director, has been appointed Director of the Reports and Statistics Service, Office of the Controller of the Veterans Administration.

**M. Greenwald**, formerly with the Atomic Energy Commission, has transferred to the Office of the Deputy Chief of Naval Operations for Air, Department of the Navy.

**S. L. Haber** has recently been transferred from Germany to head the American Joint Distribution Committee program in Morocco, Tangier, and Algeria.

**David L. Hewitt** has joined the staff of Huggins & Company, Consulting Actuaries, Philadelphia.

**A. Ford Hinrichs** is on a temporary assignment with the Legislative Reference Service of the Library of Congress as senior specialist in price economics.

**Marcus Jacobs**, formerly with the Aircraft Programming Division of the Air Force, has transferred to the Office of the Chief of Transportation, U. S. Army, as Assistant Chief of the Review and Analysis Division.

**Andre G. Laurent** has received a Post Doctoral Fellowship in Statistics and Economics, given by the Committee on Statistics of the University of Chicago.

**Charles B. Lawrence, Jr.**, formerly with the United Nations Technical Assistance Administration, has joined the staff of the Office of the Secretary, Department of Health, Education and Welfare, as Program Analysis Officer.

**Clem C. Linnenberg, Jr.**, who has been a transportation economist in the Traffic Management Division of the General Services Administration, has transferred to the Transportation Section, Transportation and Facilities Branch, Agricultural Marketing Service, U. S. Department of Agriculture, where he will be in charge of the section's work on transportation economics.

**William G. Matheny** is engaged in research concerned with the proficiency measurement of training of all-weather intercepter pilots.

**Albert S. Mincis** has left the Bureau of the Census and is now associated with the Polytechnic Institute of Brooklyn as a full-time student in their electrical engineering department.

**Jack Moshman**, formerly Senior Statistician with the Mathematics Panel of the Oak Ridge National Laboratory, has accepted a position as a member of the Technical Staff of the Bell Telephone Laboratories, Inc., at Murray Hill, New Jersey.

**Keshavan Raghavan Nair**, of the Forest Research Institute, Dehra Dun, India, has received from the University of London the degree of Doctor of Science for his work in the field of Statistics.

**Norlar Pahigian**, formerly with the Statistics Division, Bureau of Supplies and Accounts, has transferred to the Planning and Progress Division, Bureau of Ordnance, Department of the Navy.

**Rexford C. Parmelee** is on leave of absence from the Office of the Secretary, Department of Commerce, to work on a monograph on "Trends in Manufacturing" for the Social Science Research Council.

**Harold E. Pinches** has been appointed Director of Research of the American Kitchens Division, AVCO Manufacturing Corporation, Connersville, Indiana.

**Lynnette B. Plumlee** has been appointed Director of Test Development of the Educational Testing Service, Princeton, N. J.

**T. J. Reed**, formerly Director, Statistics Division of the Renegotiation Board in Washington, D. C., has joined the staff of National Analysts, Inc., Philadelphia, Pa., as Assistant Chief Statistician.

**Abel Rothman**, formerly Assistant Chief of the Office of Statistical Standards, Bureau of Labor Statistics, has been made Acting Chief of the Office.

**William B. Schrader** has been appointed Director of Statistical Analysis of the Educational Testing Service, Princeton, N. J.

**A. Thornton Steele**, Acting Associate Dean in the School of Business, Western Reserve University, Cleveland, Ohio, has been named Market Research Director for Mead Johnson and Company, Evansville, Indiana, pharmaceutical manufacturer.

**Elizabeth Vaughan** has transferred from the U. S. Fish and Wildlife Service to the Quality Evaluation Laboratory, Naval Ammunition Depot, Bangor, Washington, as an Analytical Statistician and head of the section on special investigations.

**Samuel Weiss**, formerly Chief Statistician and Chief of the Office of Statistical Standards, Bureau of Labor Statistics, has recently established a private statistical consulting office in Washington, D. C. He will, however, continue to act as a consultant to the Commissioner of Labor Statistics.

## CHAPTER NOTES

### ALBANY

The annual dinner meeting was held on March 4th at the Hotel Wellington, with Dr. Philip J. McCarthy, Professor of Statistics, New York State School of Industrial and Labor Relations, Cornell University, as the speaker. His subject was "Sample Surveys and Decision Theory."

On April 27th, Professor W. G. Cochran of the Johns Hopkins University addressed the Chapter and a large number of guests on the subject, "Methodological Aspects of Kinsey's Studies."

As the chapter year approaches its end, it looks as though the number of paid memberships will reach the 100-mark.

### BOSTON

At a meeting of the Boston Chapter held at Boston University's Machine Laboratory on March 24, 1954, Mr. John Alman, Director of Statistical and Research Services, assisted by members of his staff, presented a demonstration of the IBM Card Program Calculator, of which there are only a few in the Boston area. The group was led step by step through the solution of a statistical problem, and all had an opportunity to observe the machine at work.

### CENTRAL NEW JERSEY

The speaker at the March 15th meeting was D. S. McArthur, Group Head in the Industrial Lubricants Section of Standard Oil Development Co., Linden, N. J., who spoke on "Evaluation of Test Procedures in Industry." The March 29th meeting heard Wesley R. Bellis, Chief of the Traffic Design and Research Section, Bureau of Planning and Traffic of the New Jersey State Highway Department, on the subject, "Traffic Signals Are 'Go' Signals".

At the meeting held on April 27th F. J. Anscombe spoke on "The Best Method of Rectifying Inspection of a Lot". Mr. Anscombe has been spending the academic year at Princeton University on sabbatical leave from Cambridge University, where he has been University Lecturer in Mathematics and a member of the staff of the Statistical Laboratory since 1948.

### CHICAGO

A joint luncheon meeting with the Chicago Chapter of the American Marketing Association was held on March 4th, at

which Sidney J. Levy, Associate Director of Psychological Research, Social Research, Inc., described how the statistician, the market researcher and the psychologist can combine their efforts toward answering the vital "why" questions posed in so many areas of research. At the March 18th luncheon meeting William F. E. Long, Director of Statistics of the Radio-Electronics-Television Manufacturers Association, spoke on "The Trade Association—Cooperation for Effective Competition". The March 25th dinner meeting was held jointly with the American Marketing Association. The speaker was Robert J. Eggert, Manager of the Program Planning Department of the Ford Division of the Ford Motor Co., and a past president of both the A.S.A. and the A.M.A. Chicago chapters, who spoke on "Getting Better Mileage with Consumer Research Facts."

In April luncheon meetings were held on the 1st and 15th. The first was a joint meeting with the Chicago Chapter of the A.M.A., at which Dr. Samuel P. Hayes, Jr., Director of the Foundation for Research for Human Behavior, Ann Arbor, Michigan, described how data from psychological surveys concerning expectations can be utilized in forecasting general business conditions. The second heard Professor Harry W. Heckman, Economic Training Advisor, Elmhurst College, speak on "New Trends in Economic Training."

Professor Arthur R. Tebbutt of the School of Commerce, Northwestern University, discussed interpretation and misinterpretation of index numbers at the luncheon meeting of May 10th, which was held jointly with the Chicago A.M.A. Chapter.

### DAYTON

The meeting on March 25th heard Dr. Forman S. Acton, Director of the Analytical Research Group, Princeton University, discuss "How Big Should an Experiment Be?" Dr. Acton gave very helpful advice from a practical point of view about determining the size of the experiment and interpreting the results.

### DENVER

The Very Reverend Paul Roberts, Dean of St. Johns Episcopal Cathedral, addressed the Chapter on the subject, "The Importance of a Critical Mind in a Complex Society" at the dinner meeting held on Feb. 18th. Dean Roberts spoke of the role and importance of freedom of thought in our society, and stressed the need for spiritual development in coping

with the problems which we face today. The seminar meeting of March 18th was devoted to a discussion of "Some Problems of Business Forecasting." The discussion was led by George E. Hawkins, Chief Statistician of the Mountain States Telephone and Telegraph Co., who described the work of the Company's statistical department and its "Index of Business Activity in the Mountain States", which serves as the basis for most of the economic forecasts for management use. Dr. Chester M. Alter, Chancellor of the University of Denver, spoke to the April 15th dinner meeting on "The Importance of Basic Research in a Complex Society". He pointed out the importance of individual development if we are to solve effectively the problems which society faces.

The Denver Chapter reached in April its goal of 100 members by the end of the 1953-4 season.

### DETROIT

At the dinner meeting on March 17th Professor Wallace Gardner of the School of Business Administration of the University of Michigan spoke on "Input-Output as a Tool for Business Forecasting". The April 29th dinner meeting heard William Haber, Professor of Labor Economics at the University of Michigan, speak on the subject of the "Guaranteed Annual Wage".

New officers of the Detroit Chapter are:

*President*, STANLEY S. ROE, Assistant Statistician, Automobile Manufacturers Association.

*Vice President*, WALLACE W. GARDNER, Instructor in Statistics, School of Business Administration, University of Michigan.

*Secretary-Treasurer*, JAMES OLIVER, Principal Statistician, Detroit Health Department.

### HAWAII

A dinner meeting was held on March 25th at which the speaker was Dr. Leonard D. Bayer, Director of the Hawaiian Sugar Planters' Association Experiment Station. Dr. Bayer spoke on "Research and Teaching in the Field of Statistics", describing the formation and program of the Institute of Statistics, University of North Carolina, and discussing certain general principles applying to research and teaching in statistics.

### LOS ANGELES

A dinner meeting at which new officers for the coming year were installed was

## CHAPTER NOTES—continued from page 37

held on April 1st. The new officers are:

**President**, HUGH H. BROWN, California Taxpayers' Association.

**Vice-President**, DONALD A. SMITH, Aerojet Corp.

**Secretary**, CHARLES HARBST, Douglas Aircraft Co.

**Treasurer**, JOHN A. SCOTT, Associated Telephone Co.

John C. McKee, who had been president of the Chapter since its reorganization in 1951, was presented with a scroll expressing the membership's appreciation of his services. M. I. Gershenson, Chief of the Division of Labor Statistics and Research of the California Department of Industrial Relations, spoke on "Problems in the Compilation of Statistics of Collective Bargaining Practices."

The April 29th meeting heard Dr. Warren S. Thompson of the Haynes Foundation speak on "Development and Outlook of California Population".

A 1954 Year Book of the Los Angeles Chapter was prepared for the installation meeting. This book includes an organization chart, lists of officers and members of the Chapter, a chronology of activities and speakers, and a report on finances.

### MILWAUKEE

At the meeting held on March 10th Professor K. A. Brownlee of the University of Chicago discussed "Analysis of Variance in Action". The meeting was well attended, including persons from neighboring cities. On May 10th the Miller Brewery Co. was host for a buffet dinner and a tour of the plant. After dinner Alexander F. Smith, Manager of Market Research of the A. O. Smith Corp., spoke on "Opportunities of Statistics in Sales Analysis and Management," and E. L. Eichelberger, Quality Control Engineer at the A. O. Smith Corp., discussed "Opportunities of Statistics in Production, Quality Control and Industrial Research".

### OKLAHOMA CITY-TULSA

An all-day meeting sponsored jointly by the Oklahoma City and Tulsa chapters was held on Saturday, March 6th. The first session, "Tools for Business Research", was chaired by Professor F. R. Cella, of the University of Oklahoma. Papers were presented by Dr. Marshall Milligan of the Stanolind Oil and Gas

Co. on the "Role of Statistics in Business Research", Dr. Mitchell Locks of the University of Oklahoma on the "Role of Econometrics in Business Research", and William B. Rider of the Stanolind Oil and Gas Co., on the "Role of Electronic Computers in Business Research." The second session, of which K. D. Blood of the U. S. Department of Agriculture was chairman, was "Agricultural Statistics". R. S. McCauley of the Department of Agriculture spoke on the development of the series of annual estimates of the number of farms. W. C. Hill of the Department of Agriculture described the method of computing parity prices of agricultural commodities, and Dr. Frank Graybill of Oklahoma A. & M. College, discussed experimental design in agricultural research. The last session dealt with the topic, "What Kind of Statisticians Does Business Want?" It was under the chairmanship of Dean G. D. Overman of Oklahoma City University, and the speakers were J. W. Magann, Oklahoma Gas and Electric Co.; Professor F. R. Cella, University of Oklahoma; A. W. Wortham, Oklahoma A. & M. College; and Leslie Brooks, Leslie Brooks & Associates.

The meeting was attended by sixty-seven people. It was the general consensus of opinion that it was both entertaining and highly informative, and it was decided to make the meeting an annual affair.

### PHILADELPHIA

Dr. Simon S. Kuznets, Professor of Economics and Statistics at the University of Pennsylvania, was the speaker at the dinner meeting held on March 26th. Dr. Kuznets, who has recently returned from Israel, spoke on "Problems of Economic Research in Israel." At the 25th Anniversary Meeting of the Philadelphia Chapter, held April 23rd, Dr. Irwin Friend, Professor of Finance at the University of Pennsylvania, discussed "Alternative Economic Models for Next Year". The following officers were elected for the 1954-55 year:

**President**, DR. RAYMOND BOWMAN, Economics Department, University of Pennsylvania.

**Vice-President**, JOHN L. MARTIN, Rayon Trade Analysis Dept., E. I. DuPont de Nemours & Co.

**Secretary-Treasurer**, DR. INGRID HAHNE, Economics Department, Temple University.

### ST. LOUIS

A luncheon meeting was held on March 17th at which Martin Hilby, a partner of Longstreet-Abbott and Co. in charge of their Research and Marketing Guide Service, spoke on "Statistical Methods for Investment Decisions". Mr. Hilby discussed the statistical methods used in analyzing price movements in commodity markets and in making decisions as to the most profitable actions.

The topic of the luncheon meeting of April 21st was "Unemployment and Its Impact on the Community". Henry J. St. Clair, Chief, Research and Analysis Division of Employment Security, described the methods of measuring unemployment at the local level and recent trends in the St. Louis area; Richard Uhlig, Director of Research for the Social Planning Council, discussed the impact on the welfare agencies of recent changes in unemployment; and William A. Webb, Executive Secretary of the A. F. of L. Central Trades and Labor Union, spoke on the impact of unemployment on the workers.

### WASHINGTON

The subject of the March 22nd meeting was "The Statistical Evidence on Relation between Smoking and Lung Cancer". The chairman was Harold Dorn of the National Institutes of Health. Sidney Cutler of the National Cancer Institute reviewed the available evidence. He pointed out that during the last 20 years deaths from lung cancer have increased about 500 percent among white males and about 150 percent among white females. He concluded that the studies which have been made show an association between smoking and lung cancer, but do not prove that smoking causes cancer. Daniel Horn of the American Cancer Society described the study of smoking habits and cancer now being conducted by the Society.

Louis Guttman, Director of the Israel Institute for Applied Social Research, was the speaker at the meeting held on April 26th. His topic was "The Theory of Facets: An Approach to the Design and Analysis of Observations".



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